External Evaluation Report

INQUIRE

Inquiry-Based Teacher Training for a Sustainable Future

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The following institutions are partners in the INQUIRE project:

- University of Innsbruck, Austria
- Royal Botanic Gardens, Kew, UK
- King's College London, UK
- Museo delle Scienze, Trento, Italy
- University of Sofia, Bulgaria
- Agencia Estatal Consejo Superior de Investigaciones Cientificas, Spain
- University of Bremen, Germany
- Jardin Botanique de la Ville de Bordeaux, France
- National Botanic Garden of Belgium
- Schulbiologisches Zentrum, Hannover, Germany
- Natural History Museum Botanical Garden, Norway
- Coimbra Botanic Garden, Portugal
- Moscow State University Botanical Garden, Russia
- University of Lisbon, Portugal
- Botanischer Garten, Rhododendron - Park, Botanika, Bremen, Germany
- Botanic Gardens Conservation International, UK
- Universidad de Alcala, Spain

INQUIRE External Evaluation

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Abbreviations

AR	Action Research
BGCI	Botanic Gardens Conservation International
COP	Community of Practice
ESD	Education for Sustainable Development
IBSE	Inquiry Based Science Education
KCL	Kings College London
LOtC	Learning Outside the Classroom
NAG	National Advisory Group
PIC	Pilot INQUIRE Course
PMB	Project Management Board
PP	Project Partnership
TTC	Train the Trainer Course

About the INQUIRE Project

INQUIRE was a three year project (2010 -2013), within the 'Science in Society' Programme of the European Commission, focusing on inquiry based science education and involving 17 partners in 11 European countries. The project was generously funded by the European Union under the 7th Framework Programme. Fourteen botanic gardens were involved in the project and individually developed and evaluated their own IBSE teacher training course. INQUIRE was coordinated by Innsbruck University Botanic Garden, Austria, with support from Botanic Gardens Conservation International (BGCI), King's College London, UK and the University of Bremen, Germany.

For more information about INQUIRE visit: **www.inquirebotany.org**

1. Executive Summary

The 'INQUIRE: Inquiry-Based teacher training for a sustainable future Project' (EU FP7 SiS-2010-2.2.1.1) – hereafter referred to as 'INQUIRE Project' – was developed in order to address, in a coherent and synergistic manner, several key issues identified as having the potential to enhance science learning within, across and beyond member states of the European Union. Research and policy documents have identified these to include promoting: 'Inquiry-Based Science Education' (IBSE); quality learning about 'complex socio-scientific issues'; and linking informal and formal educational sectors (High Level Group on Science Education, 2007). Teachers are, further, recognised as a crucial constituency in terms of either promoting, or acting as barriers against implementing, these innovations in science learning. Therefore, effort directed towards providing appropriate training (in either pre- or in-service) of teachers and other educational professionals has been identified as a requisite task.

Among the complex socio-scientific issues, of most pressing importance in the contemporary age are those constellating around 'sustainability', including global climate change, biodiversity loss and conservation. These specific issues are ones with which Botanic Gardens are heavily engaged in terms of research, public understanding and public engagement. A major goal of the INQUIRE Project has been to develop the expertise, experience and confidence of participating teachers in IBSE, with an emphasis on these concerns. This relates to a range of specific curriculum areas (notably science and geography) and also the broad field of 'Education for Sustainable Development' (ESD). This has been attempted through an innovative set of mixed media (online and face-to-face) teacher training packages specific to the national and site-specific contexts of Partners. An additional feature has been the goal of creating and facilitating a collaborative 'community of practice' (CoP) of educational practitioners across the 'formal-informal' divide, drawn from Botanic Gardens, academics and practicing teachers to develop a shared, 'cross-sectoral' understanding of IBSE.

This Final report integrates findings from two phases of evaluation conducted during the second and third years of the INQUIRE Project. The first phase represented a more formative evaluation, which sought to explore the extent to which the project was working towards the achievement of its stated aims at the mid-project point, and provide recommendations for future development of the project. Three main areas of focus were identified for the evaluation in phase one, which were:

- MANAGEMENT – Project Management
- IMPACT – Partners' progress in terms of a developing understandings of, and practice in, IBSE
- IMPACT – Whole Project progress in terms of the development of a Community of Practice among Partners

The second and final phase of the evaluation process took a more 'summative' orientation, in terms of seeking to establish the extent to which the project had fulfilled its objectives as it drew to its completion

date. This phase involved a revisiting of the three foci identified to ascertain continued progress and sustained success against project objectives and stated deliverables. In addition, further specific sub-foci for exploration were identified, namely:

- (related to Project Management) Specific support implemented by the Project Management Board following recommendations from the Interim Report (this specifically related to modifications to the Pilot Manual (D4.1) to generate the Final Manual ('D.5.1. Final INQUIRE Course Manual'); and the development of a support strategy of 'Follow Up Calls' undertaken by the PMB);
- (related to whole project Impact) The continued development of Communities of Practice (CoPs) characterised by collaboration across Partners;
- The final INQUIRE conference held at Kew Gardens, London, UK, 9th-10th July 2013;
- (related to Potential impact) Future sustainability of the INQUIRE Project and/or its legacy activities.

These two phases of data collection have been combined to complete this report.

Evidence has been gathered through:

Phase 1:

- documentary analysis of project-related materials (most but not all);
- online questionnaire surveys (utilising SurveyMonkey®) administered to all Partners;
- a subsequent set of qualitative semi-structured interviews, undertaken with a sample of four institutions (single or group respondents) selected in order to provide a degree of broad coverage across the Partnership in terms of national contexts.

Phase 2:

- documentary analysis of project-related materials developed since the Interim report, including those modified as a consequence of the Interim report (this specifically related to modifications to the Pilot Manual D4.1 to generate the 'D.5.1. Final INQUIRE Course Manual') or new material (some but not all);
- online questionnaire surveys (utilising SurveyMonkey®) administered to all Partners (these recapitulated some questions from Phase 1, for longitudinal review to ascertain sustained or changed attitudes or perspectives between surveys, and extended the original surveys to take account of the new foci of Phase 2);
- follow up email contacts to ascertain further qualitative information related to specific aspects of the Phase 2 online survey (specifically: Follow Up Telephone calls)
- Attendance at, and participation in, the INQUIRE Conference, Kew Gardens (9th-10th July 2013)

It is important to acknowledge that the quantitative and qualitative primary data collected during this two-phase evaluation process relates to the expressed opinions of, and perspectives on, the INQUIRE Project (and their participation in it) of Project Partners and not those of the members of the PMB (who did not take part in data collection).

Table 1: INQUIRE Project Stated Goals/Success criteria and their achievement 1

Stated INQUIRE Project goals/success criteria (derived from INQUIRE Project course documentation: Annex I "Description of Work")	Achievement?	Evidence used in this review?
… will link informal and formal education systems as well as the science education research community through assembling an interdisciplinary project team	✔	Makeup of the INQUIRE Project PP and COP D1.1
… will develop a shared understanding of inquiry based learning in formal and informal educational institutions on a European scale	✔	Participants' responses in survey questions; D1.2; D2.2; D3.2
… will develop a rolling one-year training course for practitioners in inquiry-based learning (INQUIRE course manual) addressing pupils age 9-14 years	✔	Various sources of evidence that the courses were designed, implemented, evaluated and disseminated D2.1; D3.1; D3.1; D3.2; D4.1
… will promote already existing best practice models … throughout the project in both the formal and informal education system	✔	Various sources of evidence – most notably D5.1
… will develop a course whose subject content will highlight the major global issues of the 21st Century: biodiversity loss and climate change	✔	Content and themes covered in various courses developed across the PP (which relate specifically to these themes) – documentation provided through Glasscubes; presentation (workshops, posters, presentations) at Final Conference
… will promote learning in and outside the classroom	✔	Various sources of evidence to demonstrate learning was promoted in LOtC contexts including D4.1, D4.2, D5.1- and exemplars provided by Partners through Glasscubes; presentation (workshops, posters, presentations) at Final Conference
… will promote its course through the various national systems that support continual professional development for teachers	✔	Efforts in evidence across PP to engage with key local/regional/national partners; D6.1
… envisages to implement pilot courses at a local level throughout 11 European countries	✔	Evidence that Pilot courses were delivered – Glasscubes and Conference presentations
… will ensure that formative assessment encourages the course design to be adapted to the needs of individual countries	✔	Evidence that the Pilot course was critically and reflectively evaluated – various sources provided through Glasscubes; D4.4, D4.5

Table 1: INQUIRE Project Stated Goals/Success criteria and their achievement **2**

Stated INQUIRE Project goals/success criteria (derived from INQUIRE Project course documentation: Annex I "Description of Work")	Achievement?	Evidence used in this review?
… will create an interactive website and regularly published electronic newsletters to support a practitioners network	✔	Website and newsletters in evidence; D6.1, D6.2, D6.3
… will train teachers and informal educators to carry out their own practitioners research	✔	Various sources of evidence, in particular D4.2 & D5.1
… will encourage teachers and educators to participate in website activities through establishing a teacher recognition scheme	✔	Encouragement very much in evidence. D4.3
… will run a final Conference to disseminate the project outcomes on a European-wide scale	✔	Conference event (attended); D6.4
… will support other informal learning institutions seeking to gain experience in the area of inquiry-based science education techniques and run the INQUIRE Train the Trainer Course	✔	Evidence to indicate that non-PP partners benefited from course material and the Train the Trainers course
…outcomes will be promoted through a range of networks including the EU central information provider for dissemination of best practice	✔	Evidence of wide dissemination of project materials and findings

Overall conclusion

The INQUIRE Project has been on an impressive trajectory throughout its lifespan, which culminated in a project which has fulfilled (and arguably exceeded) its stated objectives as set out in Tables 1 and 2. Project management has been of an exceedingly high quality and has steered the INQUIRE Partnership to the successful completion of all deliverables.

Consequently, the INQUIRE Project will leave a powerful legacy in terms of the enhancement of IBSE (and ESD) within Partners' regional and national contexts, with the potential to also enhance IBSE (and ESD) across the European Union; and beyond. Beneficiaries include:

- the Partners themselves, who have developed a strong and committed CoP which will probably be sustained beyond the life of the project.
- Teachers involved directly in the training.
- The wider 'botanic gardens education community', which will benefit from the 'Train the Trainers' activities and material.
- The 'science education community' and related (e.g. ESD community).
- The 'education community' more generally.

The project will leave a robust legacy which will greatly benefit each of these constituencies. However, in order for this legacy to reach its full potential, it is desirable that additional structural support be

forthcoming from the wider science education community at the levels of practice, research and, most importantly, policy.

Table 2: INQUIRE Project Deliverables and their achievement 1

	Title	dM	Comments
1.1	Project Planning	**4**	Document (MS Excel) outlining through a series of GANTT charts (nine separate Excel Sheets, each relating to a different Work Package) a detailed breakdown of the responsibilities and timescale of each Partner. Comprehensive and easy to follow.
1.2	Document explaining criteria on how to select IBSE teaching material	**4**	Document developed by Academic Partners drawing on literature, research and practice outlining the collaborative process of selection of criteria, and the criteria themselves (Table 1). This document provides an excellent resource that is fit for purpose and which was developed collaboratively across the Partnership.
1.3	Document explaining Advisory Group constitution	**4**	Document outlining for each respective Partner (mostly in English): criteria for selection of National Advisory Group (NAG), personal biographies of members, terms of reference, and agenda and minutes of meetings. There is a broadly consistent and high quality level of reporting of the activities of each respective NAG across the Partnership.
2.1	INQUIRE Course Implementation Plan (CIP)	**5**	Document outlining each respective Partners' strategy for: integrating INQUIRE activities (including Pilot course) within prevailing regional/national policy context regarding Teacher Training etc., and also for contributing to wider international partnership. Information derived from survey. Comprehensive document.
2.2	Document summarising how IBSE is defined in INQUIRE course	**5**	Document prepared principally by Academic Partners (specifically Profs. Dillon, Elster and Dr Kapelari) providing: an overview of current thinking regarding IBSE drawing on international literature; outline of a process for eliciting current understandings of IBSE across the INQUIRE consortium (questions); and (partly based on subsequent answers) a proposed common, yet flexible, understanding of IBSE for utlisation across the INQUIRE consortium. The document addresses learning context, objectives and assessment which are commensurate with current best practice in IBSE, particularly as it relates to Learning Outside the Classroom (LOtC) contexts such as are represented in the Consortium. What is presented is neither overly prescriptive nor constraining and therefore able to accommodate and acknowledge the diversity of contexts represented so that Partners have significant degrees of freedom to interpret the common IBSE vision.
3.1	Strategy Plan for Pilot INQUIRE Course Promotion	**8**	This document provided a summary of the respective NAG's strategies to develop the Pilot course in their countries – it consisted of a short (2 page) generic pro forma completed by respective national Partners.
3.2	Document identifying relevant educational materials for inclusion in PIC	**8**	A version of this document was prepared by each national Partner in order to identify relevant educational materials for inclusion in PIC. It was structured around generic questions/issues to be addressed in the selection of this material.
4.1	Pilot INQUIRE Course (PIC) Manual	**13**	Completed – see comments in report.

Table 2: INQUIRE Project Deliverables and their achievement 2

	Title	dM	Comments
4.2	Train the Trainer Course (TTC) Manual	**25**	The TTC Manual emerged from WP3 work and was devised to support Partner organisations to run the PIC in their institution. (submitted 23/12/2012). It represents a detailed and comprehensive document which incorporates background, theoretical material from the INQUIRE Manual (particularly Pilot version) with, additionally, three exemplar courses.
4.3	Selection criteria for teacher recognition scheme is posted on the INQUIRE website	**17**	This document described selection criteria for the teachers' recognitions scheme (not available through Glasscubes at the time of writing).
4.4	Pilot INQUIRE Course participants' feedback	**25**	Completed by each Partner institution – in 'mother tongue' and translated into English.
4.5	Pilot INQUIRE Course participants' feedback (third year)	**36**	Completed by each Partner institution – in 'mother tongue' and translated into English.
5.1	Final INQUIRE Course Manual	**36**	Completed – see comments in report.
6.1	Dissemination Plan	**4**	This document represented an evolving strategy for dissemination activities planned on a national and international basis. It provided a breakdown of planned 'Partner meetings' and other relevant dissemination outlets (conferences etc.) known across the partnership. The document was comprehensive and identified a range of national and international opportunities for dissemination at events such as conferences, and through a variety of media. A particular feature has been the development of a promotional film with various language versions.
6.2	INQUIRE Information Leaflet in 10 languages	**13**	This resource provided a simple 2 side-gatefold format leaflet outlining briefly key information about the project. The leaflet has been translated into the various Partners' languages.
6.3	Dissemination Summary	**36**	This represents a tabulated pro forma of activities to be completed by each national/institutional partner outlining dissemination activities undertaken in years 2011, 2012 and 2013 (conferences etc.).
6.4	Proceedings of the Final Conference	**36**	Available at http://www.inquirebotany.org
7.1	Quality Management Plan	**12**	This deliverable was led by KCL to provide Quality Assurance of the respective institutional courses. It consists of a range of strategies and sources of evidence including formative and summative assessment of participating teachers; and portfolios of evidence accumulated by partners. Phase 1 involved 'visits' by members of KCL team. Phase 2 also incorporated Follow Up Calls
7.2	Final Quality Management Report	**36**	Available at http://www.inquirebotany.org

Table 2: INQUIRE Project Deliverables and their achievement 3

	Title	dM	Comments
8.1	Interim External Evaluation Report	**24**	Produced in October 2012.
8.2	Recommendations from Consortium Meetings	**36**	Available at http://www.inquirebotany.org
8.3	Final External Evaluation Report	**36**	This report.
9.1	Information Manual about Ethical issues	**12**	This represents a comprehensive document dealing with ethical issues appropriate to the INQUIRE project. It comprises two sections: [a] Safety and risks management of children visiting the botanic gardens [b] Data protection The document is underpinned by BERA guidelines following recommendations by the European Commission for FP7 projects. However, the diversity of ethical guidelines across the partnership is acknowledged, with each Partner contributing a specific section. The document was intended to evolve during the life of the project. Now available at http://www.inquirebotany.org

Recommendations:

For the INQUIRE CoP, as the project moves into its next post-INQUIRE Project phases

■ Attempts to provide mechanisms or strategies – geographical, language or thematic – were devised, post-Interim report, to encourage additional or more focused collaboration across sub-groups of the Partnership. However, these were not fully utilised or engaged with by CoP Partners. This is largely a consequence of resourcing. In the future, it would be desirable if such mechanisms and strategies could be operationalised more fully. This will probably require a degree of further collaboration and negotiation across the CoP to ensure successful uptake. It will also, most probably, require the identification of further resourcing from external sources.

For Policy Makers

■ Opportunities to facilitate continuing activities of the INQUIRE CoP at the institutional, regional, national and international levels should be developed.

■ The wealth of material produced by the project should be as widely disseminated as possible. Particular strengths include the central material such as the 'D.5.1. Final INQUIRE Course Manual' and exemplary materials produced by each Partner's context.

2. General Contextual Comments (relevant for potential impact)

Most European countries have seen a reduction in the numbers of students choosing to study physical sciences, engineering and mathematics at university, with even more marked falls from 1993 in the number seeking to do a PhD in these areas in all European countries (OECD, 2006). Decreasing engagement of many young people with science subjects at school is evident in the falling recruitment to the study of science and technology subjects at degree level across Europe. This is recognised as a significant problem both for the health of the knowledge economy and for the health of democratic participation across Europe. The so called 'Rocard Report' (High Level Group on Science Education, 2007) raised European Union-wide concerns about the decline in popularity among students of science and mathematics education and called for concerted effort to reverse the trend to ensure the future capacity for European society to undertake quality research and innovation. The goal of reviving science in Europe is largely focused on the way in which science is taught and disseminated. Inquiry-Based Science Education (IBSE), while not a new pedagogical concept within the academic science education community, has received considerable impetus as such a 'renewed pedagogy' for science teaching and learning across the European Union by the publication of the Rocard report in 2007 (Ibid.). However, as noted in the Rocard report:

> *… whereas the science education community mostly agrees that pedagogical practices based on inquiry-based methods are more effective, the reality of classroom practice is that in the majority of European countries, these methods are simply not being implemented.*
>
> (Ibid. 2)

A significant barrier identified in this respect is the preparedness and confidence of teachers in dealing with innovations such as this non-transmissive, student-oriented pedagogy (Gilbert, 2010).

Findings of the Rocard report particularly relevant to the INQUIRE Project include:

- A reversal of school science-teaching pedagogy from mainly deductive to inquiry-based methods provides the means to increase interest in science;
- Renewed school's science-teaching pedagogy based on IBSE provides increased opportunities for cooperation between actors in the formal and informal arenas;
- Teachers are key players in the renewal of science education. Among other methods, being part of a network allows them to improve the quality of their teaching and supports their motivation.

(Ibid.3-4)

The report then goes on to make significant recommendations, chief among which, from the perspective of the INQUIRE Project, are:

Recommendation 2: Improvements in science education should be brought about through new forms of pedagogy: the introduction of inquiry-based approaches in schools, actions for teachers training to IBSE, and the development of teachers' networks should be actively promoted and supported.

Recommendation 4: Measures should be introduced to promote the participation of cities and the local community in the renewal of science education in collaborative actions at the European level aimed at accelerating the pace of change through the sharing of know-how.

(Ibid.4)

In addition to such a focus on pedagogy, the science education community, in Europe and around the world, has also considered the content of science education curricula in terms of the engagement of, and perceived relevance to, young people. Indeed, research suggests that there is no lack of interest in science, but rather the topics that are of contemporary interest, such as global warming, the ethics of animal experimentation, cosmology, space exploration, medical advances and many more, seldom appear within school science (Millar and Osborne, 1998, Osborne and Dillon, 2008).

Simon and Osborne (2010) note that students' attitudes become less positive as schooling progresses and school science is not often identified as a favourite core school subject, although students often reveal a positive attitude to science, per se. Simon and Osborne suggest that *"this gulf is due to the message presented by school science, which situates science as a value-free, detached activity unrelated to any societal context that would give it meaning or relevance – a view which is characterised by the notion that 'science is important, but not for me"* (Ibid.247).

Thus, the level of engagement stimulated by such complex socio-scientific issues as 'global warming' contributes to the pedagogical benefits which flow from the fact that they are necessarily controversial (requiring consideration of multiple perspectives), relatively open (there are no demonstrable 'right' or 'wrong' answers and invite 'inquiry'), have a significant ethical dimension, and are relevant. This has implications both for promoting 'science education for all' students and enhancing 'scientific literacy' among Europe's citizenry. Simon and Osborne go on to summarise the factors which seem from the research to be influencing students' attitudes to school science, specifically, teacher- and teaching-related factors – the influence of particular teachers and their teaching styles can have a significant impact. Enthusiastic, knowledgeable teachers, who are willing to engage in active learning strategies, can give rise to positive attitudes. Conversely, teachers who lack subject knowledge and confidence and/or adopt didactic approaches can 'switch students off'.

Evidence such as this indicates the crucial role of teachers in enhancing the engagement in science through their promotion of IBSE and sustainability related issues. However, more often than not, there exists a relative lack of expertise and confidence on the part of teaching community in terms of these factors in good science learning. Consequently, the importance of teachers is often stressed, as too is, by implication, providing appropriate teacher training in both pedagogy and content (specifically related to complex socio-scientific issues). Thus, the provision of adequate professional training and education, both pre- and in-service, is commonly identified as one of the major strategies for integrating IBSE and complex socio-scientific issues into school science (Gilbert, 2010), in support of the Recommendation 4 of the Rocard report (see above).

Finally, research has also revealed that informal and non-school based learning contexts such as museums, botanic gardens, farms, field studies centres – so called 'learning Outside the Classroom (LOtC) contexts – and the involvement of practitioners engaged in activities associated with such organisations, represent powerful vehicles for enhancing understanding and engagement in science learning through hands-on, experiential activities and real-world relevance (Rickinson et al., 2004, Dillon et al., 2005, Committee on Learning Science in Informal Environments, 2009, Fenichel and Schweingruber, 2010, King and Glackin, 2010).

Once again, the involvement of such informal educational providers is an important recommendation of the 'Rocard' report (op. cit). Such learning contexts are particularly powerful in terms of exploring 'complex socio-scientific issues' associated with social, environmental and sustainability issues.

3. The INQUIRE Project's potential impact on/contribution to enhancing the quality of science learning

The INQUIRE Project was purposely set up with these specific findings and recommendations of the Rocard report and related research in mind. Specifically, the project aimed to draw on the expertise of practitioners in the informal, LOtC sector – in this case botanic gardens – in the development of teacher competencies and confidence in delivering IBSE framed within considerations of contemporary 'socio-scientific' issues related to sustainability, biodiversity loss and climate change. Such 'socio-scientific' issues are crucial dimensions of the contemporary work in the botanic gardens sector, where significant and cutting edge scientific work is being undertaken, as are efforts to enhance 'public understanding' and engagement. Consequently, through facilitating and promoting botanic gardens as learning environments or providers of educational resources, the INQUIRE Project stands to contribute significantly to quality science learning.

However, educators working in the context of botanic gardens also represent a constituency made up of practitioners themselves, with varying degrees of expertise, experience and confidence of promoting IBSE and learning about complex socio-scientific issues. Consequently, important features of the INQUIRE project are mechanisms to enhance conceptual and pedagogical understanding both within and beyond the INQUIRE Project Partnership (PP). Thus, the PP is itself strongly conceived as an emergent CoP, through which participating individuals and organisations will benefit from dialogue and collaboration in terms of developing their individual and collective capacity in promoting quality science learning. A further feature of the INQUIRE Project in this respect is its promotion of 'action research' (AR) and formative assessment as appropriate methodologies for continual reflection-on-action and improvement during (and beyond) the life of the project.

It must be recognised, therefore, that there was going to be a wide range of expertise across the Partnership and that the professional development of Partners represented a key dimension. In addition, a significant goal of the project has been to cascade the learning undergone by project Partners in order to 'scale-up' impact. Consequently, a feature of the project has been the development of a 'Training the Trainers' package of materials – D.4.2. Train the Trainer Course Manual – directed towards educational practitioners in the botanic gardens sector beyond the immediate PP.

This wide range of interrelated activities and goals was ambitiously set out in the stated goals of the INQUIRE Project (Annex1 p.4) which state that it:

- will link informal and formal education systems as well as the science education research community through assembling an interdisciplinary project team;
- will develop a shared understanding of Inquiry-Based learning in formal and informal educational institutions on a European scale
- will develop a rolling one-year training course for practitioners in inquiry-based learning (INQUIRE course manual) addressing pupils age 9-14 years;

- will promote already existing best practise models … throughout the project in both the formal and informal education system;
- will develop a course whose subject content will highlight the major global issues of the 21st Century: biodiversity loss and climate change;
- will promote learning in and outside the classroom;
- will promote its course through the various national systems that support continual professional development for teachers;
- envisages to implement pilot courses at a local level throughout 11 European countries;
- will ensure that formative assessment encourages the course design to be adapted to the needs of individual countries;
- will create an interactive website and regularly published electronic newsletters to support a practitioners network;
- will train teachers and informal educators to carry out their own practitioners research;
- will encourage teachers and educators to participate in website activities through establishing a teacher recognition scheme;
- will run a final Conference to disseminate the project outcomes on a European wide scale;
- will support other informal learning institutions seeking to gain experience in the area of IBSE techniques and run the INQUIRE Train the Trainer Course
- outcomes will be promoted through a range of networks including the EU central information provider for dissemination of best practice

4. External Evaluation Process

This Final External Evaluation Report is the culmination of two phases of evaluation into the extent to which the project moved towards achieving these broad aims. The evaluation is written with multiple purposes and associated audiences in mind. On the one hand, the European Commission, as the commissioning/funding body to whom the project is accountable, requires some assurance that the project fulfilled its stated aims. As such, this report provides a 'summative evaluation' of those aspects of the project which comprised the foci of the External evaluation in phases 1 and 2 (other aspects have been evaluated 'internally' by KCL).

Additionally, the evaluation, particularly in Phase 1, sought to provide formative and developmental information to support the INQUIRE Partnership as it progressed through its activities. In this respect, the evaluation has been intentionally 'utilisation-focused' (Patton, 2000), in that it was intended to prove useful for the 'primary users' both during and at the end of the project. With such an approach, it was wholly appropriate to negotiate with this constituency in order to establish the kind of evaluation that would be most useful. In this instance, the 'primary users' were considered to be the Project Management Board (PMB) working on behalf of the whole Project Partnership (PP). Consequently, negotiations took place between the External Evaluator and representatives from the PMB to collaboratively establish mutually acceptable foci for the External Evaluation. The PMB was represented by colleagues from KCL (specifically Professor Justin Dillon and Dr. Elaine Regan), which represented the key academic Partner for the INQUIRE Project experienced in educational research and evaluation[1], and the Principle Investigator (PI – Professor Suzanne Kapelari).

For Phase 1, a meeting took place on 22nd March 2012 at KCL (the PI attending virtually, via Skype), from which the following three main areas of focus were identified for evaluations:

- Project Management
- Partner Effectiveness
- Potential Impact

Subsequent to the production of the Interim External Evaluation report in October 2012, the PMB had an opportunity to review the report and identify preferences for future foci for evaluation into Phase 2. These were shared with the External Evaluator via representatives from the lead academic Partner KCL (Professor Justin Dillon and Dr. Elaine Regan) during a meeting that took place via Skype on 25th March, 2013. At this negotiation meeting it was agreed that, in addition to revisiting the previous three foci (identified above), additional or supplementary foci would be:

- Specific support implemented by the PMB following recommendations from the Interim Report (this specifically related to modifications to the Pilot INQUIRE Course Manual D4.1 to generate D.5.1.

1.Initially, another partner was involved in the project as an Academic Partner. Unfortunately, as recounted in the Interim report, this partner was identified as not satisfactorily contributing to the success of the Project Management and, as a consequence, was requested by the rest of the PMB to step down from this managerial position. The situation was sensitively and professionally handled and a satisfactory conclusion reached with the Board Member in question stepping down.

Final INQUIRE Course Manual; and the development of a support strategy of 'Follow Up Calls' undertaken by the PMB);

- The continued development of CoP (characterised by collaboration across Partners);
- The INQUIRE conference;
- Future sustainability of INQUIRE.

Data Collection

Evidence has been gathered through:

Phase 1 (leading to Preliminary Report):

- Documentary analysis of some project-related materials accessed through the Glasscubes system (a dedicated folder was set up on the system for External Evaluation related materials);
- a set of 3 online questionnaire surveys (utilising SurveyMonkey®)[2] administered to all Partners, one survey of ten questions for each research focus. The surveys were undertaken during the period May-June 2012;
- a subsequent set of qualitative semi-structured interviews undertaken with a sample of four institutions (single or group respondents), selected in order to provide a degree of broad coverage across the Partnership in terms of national context. Interviews were undertaken using Skype™[3];
- Finally, informal discussions took place between the External Evaluator and participating Partners of the INQUIRE Project PP/COP – during two face-to-face Project Partnership Meetings: Wakehurst Place, UK (2nd – 5th May 2011) and Lisbon/Coimbra, Portugal (2nd – 5th October, 2012).

Phase 2 (culminating in this Final report):

- Documentary analysis of project-related materials developed since the preliminary report, including those redeveloped as a consequence of the preliminary report or new material (e.g. D5.1);
- online questionnaire surveys (utilising SurveyMonkey®) administered to all Partners (these recapitulated some questions from Phase 1 for longitudinal review to ascertain progress and

Table 3: Schedule of semi-structured interviews via Skype

Day	Time	Participating Organisation	Interviewee(s)
Monday 23rd	10.00 - 11.00	Bordeaux, France	2 female
Tuesday 24th	11.00 - 12.00	Universidade De Lisboa, Portugal	2 female
	14.00 - 15.00	Kew, UK	1 female
Wednesday 25th	11.00 - 12.00	Museo Tridentino Di Scienze Naturali, Trento, Italy	1 female & 1 male

2. This system was chosen because it is freely available online and therefore would not incur a cost to partners. However, the system is limited to 10 questions per survey in the basic package.

extended the original surveys to take account of the new foci of Phase 2). The surveys were undertaken during the period June-July 2013 (in the run up to the final INQUIRE Conference);

- follow-up email contacts to ascertain further qualitative information related to specific aspects of the Phase 2 online survey (specifically: Follow Up Telephone calls).
- Attendance at, and participation in, the INQUIRE Conference, Kew Gardens (9th-10th July 2013)
- Informal discussions with INQUIRE Project Partners during the INQUIRE Conference, Kew Gardens (9th-10th July 2013)

It was not deemed possible for logistical reasons, nor necessary, to undertake semi-structured interviews via Skype during Phase 2 data collection. For ethical reasons, verbatim responses from either survey questions and/or interviews used to support observations in the following sections are deliberately anonymised.

It is important to acknowledge that the quantitative and qualitative primary data collected during this two-phase evaluation process relate to the expressed opinions of, and perspectives on, the INQUIRE Project (and their participation in it) of Project Partners and not those of the members of the PMB (who did not take part in data collection).

3. Once again, this system was chosen because it is free. However, the quality of audio links during some interviews was variable and some portions of the interview were 'broken' through lost connections, and some recorded material was inaudible.

5. Project Management and Support

The INQUIRE Project has been exceedingly well managed – and universally recognised as such – across the Partnership. This standard was maintained throughout the project, with responses from both phases of data collection providing evidence of consistently positive experiences. Project management has steered the INQUIRE Partnership to the successful completion of all deliverables (see Table 2):

5.1 Level of support

In general, Project Partners have felt exceedingly well supported throughout the project. In answer to the survey question: "Are you satisfied with level of support provided by the Management Board?", no respondents reported that they were dissatisfied in either Phases 1 and 2 responses, while the majority – (57.1% Phase 1, n= 21; 50% Phase 2, n= 16) – indicated that they were 'Extremely satisfied'. The second category – Moderately satisfied – represented the second most popular category (33.3% Phase 1, n= 21; 44% Phase 2, n=16).

The survey request for respondents to answer the question "Can you identify a particular strength of the INQUIRE Project Management Board? (please provide a comment)" (Phase 1 - Survey1 Qu2; Phase 2 – Survey 1 Qu7) elicited a universally positive responses in both phases. Taken together, the comments acknowledged the professional nature of the PMB – their expertise, their timeliness in responding to queries and the levels of support provided. Comments included:

Phase 1:
"I think, that the strength is that in team PMB work highly professional people having wide practical experience. They can understand our problems and set the specific goals and tasks at all stages of realisation of the project"
"The support of the Management Board is on a daily basis and very good. We know, what we have to do and all tasks are coordinated. It was a great help for us, that we had extra support to run the website in a better way. Only with the help of the Management Board is it possible for us to fulfil the INQUIRE quality standard."

Phase 2:
"I think the discussions about IBSE and biodiversity (were) on a very high Level. I have learned a lot about botanic gardens and the BGCI. I hope that in future there will be possibilities to cooperate."
"The close support and quick clarification of doubts that the Management Board gave to the Partners."

In addition, an open ended commentary in Phase 2 Survey 1 Qu10 elicited the following comment:
"The support from BGCI was very important. I found I could always contact them with any questions or requests, suggest and discuss ideas, and request letters of support (for internal reporting, visa applications etc.)".

5.2 Responsiveness

Once again, responses reveal that INQUIRE Project Partners have felt that the PMB and Project Administrators have been exceedingly responsive throughout the project. In answer to the survey question: "How responsive is the INQUIRE Management Board?" (Phase 1 - Survey 1 Qu 4, n=21; Phase 2 – Survey 1 Qu 3, n=16), no respondents indicated 'unresponsive'. The most popular answer in Phase 1 was 'Extremely' (47.6%, n=21) and the next most popular was 'Very' (38.1%, n=21). In Phase 2, the rank order of responses was reversed, with the most popular answer being 'Very responsive' (56.3%, n=16). with 'Extremely' representing the second most popular choice (37.5%). In phase 1, it should be noted that 9.5% and 4.8% (n=21) responded 'Moderately' or 'Neutral' respectively. In phase 2 one respondent (6.3%) also indicated 'Moderately' but no respondents selected the Neutral category. However, the overwhelming balance of opinion was towards the highest response categories in both phases.

5.3 Strengths/Weaknesses

When offered the opportunity to express opinions about the strengths and/or weakness, the overwhelming balance of opinions expressed by respondents was very positive and the vast majority of respondents indicated strengths with few noting weaknesses. Particular strengths related to the observations already noted in terms of 'levels of support' and 'responsiveness'.

However, it is appropriate to note those minority comments which did raise some areas for development during the project. In phase 1, one respondent replied, in answer to the question "Can you identify a weakness or area for improvement of the INQUIRE Project Management Board? (Please provide a comment)" (Phase 1 Survey 1 Qu3):
"Some doubts or misunderstandings are not answered as fast as we wished. The inability to promote the community of practice between Partners other than in the meetings."

This comment was not representative, however. Similarly, in Phase 2, the same question (Phase 2 Survey 1 Qu8) elicited mostly positive comments, but some comments did note some areas about which they were less positive, but these mostly related to logistical matters that were largely beyond the control of the PMB or INQUIRE Project. For example, three comments related to delayed payment (which was, in fact, a consequence of a website problem at the European Commission level and was, therefore, beyond the control of the PMB). A minority of comments identified some issues in relation to workload and timing:
"To anticipate more. Choose a better strategic timing for giving task (some came really late for us to be able to be organised toward the other institution work)."
"For improvement I recommend that the MB should give us the details for the tasks a bit earlier. The management board should give more support and advice to the working groups that we built up in Portugal."

However, it was more generally the case that participants felt that activities were realistic and achievable within existing constraints of time and prevailing workloads. Another unrepresentative and unique comment criticised communication between PMB and Partners:
"Some lack of information on the Management board developed work. No feedback on Partners evaluation: what could be improved or not by the Partners."

Once again, this was not the balance of opinion across the PP, which was much more positive. Other comments were also made under this open question heading, which are addressed as appropriate below.

5.4 Opportunities to collaborate

Once again, the overall impression given in the responses is that the participants valued the opportunities to collaborate and acknowledged that, within the constraints presented to the project in terms of funds available and existing workloads, these opportunities were good. Participants particularly valued face-to-face meetings. There were some comments which indicated that some Partners would have welcomed more opportunities to participate, but these were often acknowledged to be challenging within the project's constraints. This desire should also be taken as further evidence of the high levels of engagement engendered across the PP CoP. It should also be noted that the PMB, in response to this issue being raised in the Interim Report, devised a strategy to provide more opportunity for collaboration, through the creation of smaller collaborative teams within the PP CoP around a number of specific themes. This strategy was presented at the Lisbon meeting and Partners were initially enthusiastic and signed up to particular themes that were of most interest to them.

The themes proposed were: Evaluation techniques for the INQUIRE courses; IBSE Lesson Plans; marketing the INQUIRE Courses; and 'Connecting Participants Across the Inquire Courses'. However, after the Lisbon meeting, Partners' engagement with these collaborative teams was relatively weak and the success was therefore compromised. The reasons for this relative lack of uptake of this strategy was not due to lack of enthusiasm, but the constraints of cost, time and prevailing workloads. The limited success of this strategy is, therefore, understandable given these constraints.

The survey question: "Are you satisfied with the number and quality of opportunities to collaborate with Partners in the INQUIRE Project? (Phase 1 Survey 1Qu 9, n=21; Phase 1 Survey 1 Qu9, n=16) resulted in a greater spread of responses across the spectrum of possibilities in both phases (see table 4). While it is inappropriate to make direct statistical comparisons across the phases, it is interesting to note the more even spread across responses in Phase 2 (with a smaller proportion of 'Very' relative to a greater proportion of both 'Extremely' and 'Moderately' responses).

The relative lack of 'Extremely satisfied' responses and the greater proportion of 'Moderately' responses relative to other questions perhaps raised some issues about perceived opportunities for collaboration,

Table 4: Reponses to question: "Are you satisfied with the number and quality of opportunities to collaborate with Partners in the INQUIRE Project?"

Responses	Phase 1		Phase 2	
	%	n=21	%	n=16
Extremely satisfied	9.5%	2	18.8%	3
Very satisfied	61.9%	13	43.8%	7
Moderately satisfied	23.8%	5	37.5%	6
Neither satisfied nor unsatisfied	0.0%	0	0.0%	0
Moderately dissatisfied	4.8%	1	0.0%	0
Very dissatisfied	0.0%	0	0.0%	0
Extremely dissatisfied	0.0%	0	0.0%	0

a crucial matter in terms of facilitating the development of a CoP. This was further borne out in two responses to Phase 2 Survey 1 Qu8: "Can you identify a weakness or area for improvement of the INQUIRE Project Management Board? (Please provide a comment)".
"To increase the number of opportunities to collaborate with Partners in the INQUIRE Project"
"To improvement the number of opportunities to collaborate with Partners"

However, as noted above, this spread of results and comments such as these should perhaps be taken as indicative of the overall enthusiasm for collaboration engendered across the PP and a desire for even more, rather than a criticism of the provision as being inadequate or unsatisfactory.

The Phase 2 Survey 1 incorporated an additional open-ended question (Qu10) which asked for a reason for responses to Qu9 "Are you satisfied with the number and quality of opportunities to collaborate with Partners in the INQUIRE Project?" This elicited the following comments which were generally very positive. In general, respondents indicated that they had valued the opportunities that had been created by the project. While more opportunities to collaborate were deemed highly desirable, it was acknowledged that logistical constraints of lack of time and money to dedicate to the project, at either the institutional or INQUIRE project level, made further collaborations challenging to achieve. Indeed, this was borne out with the aforementioned efforts made by the PMB, post-Lisbon meeting, to develop the strategy of smaller collaborative teams working on particular themes, which met with limited success in terms of Partners' uptake and engagement. However participants did highly value those opportunities devised, as the following statements reveal (the most important points raised in the following comment are highlighted in bold):
"I think the project gave us unique opportunities to meet and work with new Partners, thanks to the regular meetings hosted by the project participants. During these meetings, the hosts conducted practical lessons using their own techniques and the visitors learned about their resources, educational programmes and botanical collections. ***This was invaluable for enhancing our own professional***

***standards and establishing new contacts**. I liked the fact that top scientists in climate change and its impact on plants were invited to the meetings and that we were given outdoor excursions. …. It would have been wonderful to visit every Partner in the project in turn, but I realise that there are financial constraints. **I think the practice of the Board nominating pairs of participants to discuss and evaluate our work during the meetings was very valuable. It was very efficient, and I took on board virtually all the comments made by our Partners when developing up my lesson plans**. I have also now begun using this practice in my course….."*

"Time constraints: We have the feeling more could have been collaborated with our international Partners but this was rather due to our lack of time than to a lack of the organisation."

All of these observations provide strong evidence of the development of a strong and enthusiastic CoP. However, one respondent's response did suggest that the project workload was challenging and that opportunities to collaborate were largely restricted to taking place within designated project meetings.
"The work to do with the project was intense and with many tasks with short deadlines, most of the times. So, the good oportunities [sic.] of collaborative work with Partners were concentrated in the meetings, that were well organised and developed, but there was more presentations of each Partner work, than new IBSE case studies to be constructed by the different Partners, as a team work ..."

However, in the same open statement, this respondent went on to express the very strong desire, which was in evidence across the Partnership, to work collaboratively as part of a CoP and, indeed, was creatively and reflectively suggesting how this might be achieved:
A suggestion maybe, with one more day meeting, create outdoors IBSE tasks for the whole Partners project implement as a team work, organised in small groups, learning "at the field" with each others. Then work organisation and presentation, sharing and reflexions – time for questions and answers, clarification of doubts and new outdoors IBSE products to all Partners to be implemented and disseminated, afterwards.

In addition, one respondent did suggest that the delay between the last Partner meeting and the conference was significant and an additional meeting between these events would have been desirable:
"There is a gap between the last Partner meeting and the final conference. It would have been better to have a meeting."

One Partner drew on their experience of having been involved in another international partnership project to suggest that closer collaboration might have been possible, perhaps oriented around small focused working sub-groups:
"I would have appreciated to collaborate closer with certain Partners to a more specific theme. If I compare the INQUIRE Project with plantscafe, I miss the leitmotif. Biodiversity and climate change are very huge topics, thus every Partner has developed its own lesson plans. My suggestion would have

been to have working groups to certain subtopics to have clearer outcomes of lesson plans. The face-to -face meetings have been very efficient. There should have been some more meetings, even to see more Botanical garden and the way they work."

One respondent's response indicated that certain Partners were able to take advantage of regional and national connections to collaborate over and above scheduled whole-Partnership meetings and opportunities:
"The communication between our institution and another German project Partner was intense. Here we changed a lot of materials and informations. Maybe that depends on the closeness to the other institutions."

Taken together, comments such as this are revealing because they indicate the degree to which INQUIRE Project Partners had become motivated to consider ways to enhance the emerging CoP. This is a powerful observation, given that a significant goal of the INQUIRE Project was the development and empowerment of a CoP. On the one hand, this could represent an idea that the PMB could take forward beyond the life of the project. On the other hand, and perhaps more positively, it would be desirable for Partners themselves to take ownership of these ideas and drive the process forward 'from the ground up' during, and beyond, the life of the INQUIRE Project.

5.5 INQUIRE Manual

Several versions of the Pilot and Draft Manuals are in existence, as each Partner had to develop one suitable for their specific context, notably in terms of language but also with some minor contextual variations. Specifically, the D. 5.1. Final INQUIRE Course Manual has been produced, and made available, in 10 languages – and this was adapted by Partners based on the socio-cultural context in which it will be used. For the purpose of the evaluation process, the Kew (UK Partner) Handbooks were examined – the English Language versions of D4.1 The Pilot INQUIRE Course Manual and D5.1 Final INQUIRE Course Manual – as they were deemed to be adequately representative and written in English (the first language of the External Evaluator).

Deliverable D4.1 was the production of a 'Pilot INQUIRE Course Manual', which was evaluated in Phase 1 and the following recommendation was made in the Interim External Evaluation:
"The 'Pilot Handbook' (D4.1), while currently being an excellent resource, could possibly be made simpler and more 'user friendly' for a teaching audience by slimming down still further the amount of academic theory and literature. Further judicial editing of references and technical jargon might be worth considering providing it does not compromise on the overall quality of the handbook" (Morgan, 2012, 7).

This recommendation was based exclusively on the Phase 1 evaluation of this document by the External Evaluator and did not draw specifically on participants' perspectives or insight provided in

Phase 1. However, this recommendation was subsequently borne out in a single (and therefore not necessarily representative) Phase 2 Survey 1 Qu8 response:
"The PIC [Pilot Inquire Course] Manual was to [sic. – taken to mean 'too'] theoretical and not very useful for direct application."

As a consequence of the Interim Report recommendation, and through reflexive practice, the 'D.5.1. Final INQUIRE Course Manual' was restructured from the Pilot version.

The 'D.5.1. Final INQUIRE Course Manual' represents a comprehensive document to support the delivery of an INQUIRE course, through providing participants with background into the INQUIRE Project's operations and rationale, a detailed exposition of best practice in IBSE, and the course itself. A particular feature of the course is the emphasis on nurturing the reflective practice of, and a CoP among, participants. Partners were able to use and adapt a generic template to create their own context-specific version (translated with additional context-specific information incorporated). There is a judicious balance of theory and practice and the document uses some technical jargon, but this is thoroughly explained.

5.6 PMB Support Strategies

5.6.1. Support Visits

In Phase 1, Support visits were undertaken by representatives from KCL, who travelled to the Partners for face-to-face meetings. All Partners had one personalised support visit from KCL, paid for by the KCL budget. A second visit was offered at the Partner's own expense. The Support Visits were deemed to be very helpful, although the PMB noted that budgetary constraints meant that no Partner requested a second support visit. Communication was, however, maintained by email/phone.

Support Visits were generally perceived to be 'Very' (38.1%) or 'Extremely' (33.3%) helpful, respectively (Phase 1 - Survey 1 Qu8, n=21). However, one interviewee identified one academic Partner as possibly less approachable than the other academic Partners and non-academic Partners. It is important to acknowledge that the individual concerned was NOT part of the KCL team and was NOT the individual charged with undertaking support visits. The person in question did initially occupy an 'academic support role' but changed roles during the lifetime of the project (see Footnote 1), a move that was not widely advertised across the INQUIRE Partnership given the sensitive nature of the process. This may have subsequently caused some confusion among some participants as to their specific role.

Despite such generally positive attitudes towards the support visits in Phase 1, there was a relative lack of uptake for the second visit offered by KCL. This was recognised by PMB and is a likely consequence of budgetary constraints. This observation contributed to the development of a strategy by the PMB to instigate 'Follow Up Calls' in Phase 2 ,which was instigated partly as a response to comments presented in the Preliminary External Evaluation Report.

5.6.2. Follow-Up Telephone Calls

The PMB subsequently, and partly in response to comments in the Preliminary External Evaluator report, devised a further support strategy in terms of 'Follow-Up Calls'. The overwhelming response to these was positive, with 81.4% Partners expressing that they found the phone call helpful. The Phase 2 Survey 1 Question 6: "Have you found the FOLLOW-UP PHONE CALLS by the management board useful?" gave rise to the following outcome:

Table 5: Phase 2 Survey 1 Qu6 results

Responses	Results	
Extremely helpful	18.8%	3
Very helpful	31.3%	5
Moderately helpful	31.3%	5
Neither helpful nor unhelpful	18.8%	3
Moderately unhelpful	0.0%	0
Very unhelpful	0.0%	0
Extremely unhelpful	0.0%	0
Answered question	100.0%	16
Skipped question	0.0%	0

In order to deconstruct this variation in responses, a specific email was sent to all (n=16) survey respondents, seeking further qualitative information. Table 6 sets out the variation in responses against category of response for all responses received (n=12/16):

It is important to note that no respondents responded in the negative category of 'Unhelpful', with the range of responses falling between 'Extremely' to 'Neither Helpful nor Unhelpful'. These responses suggest that the variable perceptions on the usefulness of the Follow-Up Calls reflects the different requirements, needs and expectations of the interlocutors and/or their personal characteristics. Where the 'Follow-Up Calls' were evaluated very positively (Extremely or Very Helpful), it seems that Partners welcomed the opportunity to clarify specific issues that they had encountered. This was particularly valuable in order to keep on track during the hiatus between meetings. The process also allowed for a more targeted support dialogue (specific needs of the Partner at that specific time), which was more productive than responding to generic issues. Additionally, Follow-Up Calls were positively evaluated where there was a structure and focus which was shared prior to the call in order to support critical and reflexive discussion and forward-thinking, which supplemented other communication and reflection mechanisms. It is also notable that the process of preparing for the call encouraged collaborative dialogue among participants at the same Partner institution.

Table 6: Verbatim responses by category to email request for further qualitative information explaining responses to Phase 2 Survey 1 Qu6 1

Category	Verbatim responses
Extremely helpful (2/3)	I consider the FOLLOW-UP PHONE CALLS by the management board not only "extremely helpful" but necessary. Mainly, because more partners´ meetings were impossible to organise due to budget constraints and the need to attend other responsibilities in our institutions. Skype meetings have been a cheap, fast and adjustable way of solving those issues that couldn´t be solved during the meetings or new questions that might arise.
	I just wanted to say that those calls with Y [member of PMB] have been very useful to solve little details that we had no [sic.] so clear, or to speak about some topics that we did not have any other moment to speak about. We felt more in contact with the management board and more confident with ourselves feeling that we had someone "at hand".
Very helpful (5/5)	Firs [sic.] point is that these kinds of talks are more than assessment – it is a kind of support, or at least I feel it like this. The questions that we had in advance were helpful to analyse the process during INQUIRE course implementation and evaluation – to focus on different aspect and to point on straight as well as to reflect on challenges. The 'call' format had differences fromwriting reflection. In other words it "overbuilds" the process of reflection. We also find the last Skype call really helpful. For example – we had to think about the sustainability of the INQUIRE course and trough [sic.] one clarifying question I really got a new idea what UBG could try to implement in our educational practice in the future. Moreover – in each conversation we had an opportunity to ask questions or any additional information – that is way we found it was useful.
	After the 4th Partner's Meeting 3 to 5th October 2012 there was a longer break and only little contact between the Partners and the Management Board. We had all a lot of work to fulfill the tasks but the sense of overall awareness got a little bit lost. The FOLLOW-UP PHONE CALLS filled this gap.
	I think the phone call contacts were mostly helpfull because it made us ('A' and me) think about what we were doing in and about the Inquire courses. It made us reflect about it and it forced us to take the time to discuss certain thinks. Not that we wouldn't have talked to each other otherwise, but since we're always busy ... Apart from that, exchange on practical issues like deliverables, administration etc. was another positive aspect of the phone calls.
	They really followed-up the work I was doing on the project that time, what helped me in five main aspects: ● More direct conversation was easier to explain about work issues and questions; ● Less time consuming resolving some questions at the moment; ● As the calls were monthly booked, when working to completing the tasks I could construct and plan new questions to be asked next call; ● When talking, new aspects or details could appear and be considered; ● Every asked question had a concrete answer, helping me to move forward more confidently.
	Here are some of the things we discussed by phone: ● I discussed with X [project administrator] the possibility of certification of our participants with BGCI INQUIRE course certificates and it was very important for our participants to receive those certificates. ● I consulted about the payments and the the possibility of buying a computer. ● We talked about some problems with the INQUIRE website. ● The possibility of changing the start dates of the TTC course. ● The possibility of admitting postgraduate students to the TTC. ● The organisation of invitations to the INQUIRE final conference for the participants. ● We also discussed ideas for the INQUIRE filming.

Table 6: Verbatim responses by category to email request for further qualitative information explaining responses to Phase 2 Survey 1 Qu6 2

Category	Verbatim responses
	X, Y and Z [key members of the PMB] responded very quickly to all my questions and were very helpful in their advice.
Moderately helpful (2/3)	The FOLLOW-UP Phone calls were just moderately helpful for me, because I just told the MB about the changes in our second teacher training course, which assessment techniques we have chosen for the course and how we are looking forward after the end of the project. There had been nearly no questions from our side. The questions that we had were answered very fast by the MB. So, for me it felt more that the call was to tell the MB how far we are in the process of the course and the tasks. I haven`t got a suggestion to improve the follow up, because I think, if there are institutions who need some more support, the phone calls might be more useful.
	Well, I remember 2 telephone calls. The first was long and taped. I had to agree to be taped. It was more a qiestionning [sic.] from the B [national partner] group. As W [academic in the Partnership] had problems with english it was U [partner] who did the questionning. I had NO help from that. Next time it was C [PMB member] phoning me. We had a nice talk, but it could well be me not having prepared it properly, because we didn't talk about what I felt stressing. I was uncertain about how many of the lesson plans with had made during the course that should be translated to English. And I had problems with getting help to calculate VAT on all bills, so I had to spend two nights on that boring issue. The phone calls I have made myself to X [Project Administrator], when I was uncertain about specific topics, have been much more helpful. I didn't feel that the calls helped me, they were more check up calls. I hope you don't get disappointed from this mail. But especially the B [national partner] call (40 minutes) was worthless.
Neither helpful nor unhelpful (3/3)	I can't remember the 1st final Survey in detail, but I think that I have answered to the question about the follow-up telephone calls with "neither helpful nor unhelpful" because I didn't led any interviews. I asked for the interview guideline and wrote the answers. So I had more time to think over the questions and answers, I worked in my own speed.
	Thanks for this email. I read this and make me think a lot...I suppose this was your intention! Now concerning your question: "Have you found the FOLLOW-UP PHONE CALLS by the management board useful?" ● From a practical point of view I never realised in what way it was useful for us, as participants. The only feedback we received was that everything was OK and well done but we never got any particular information about the benefits or lacks of our actions. And this means that I, particularly, never understood the practical use of this evaluation for the project as a whole. ● From my point of view, it was very interesting. And this because we were obliged to internalise and summarise the weakness and strong aspects of our own performance and course. ● From a general view I do think that the best improvement of this process is to explain to the participants what were the weak parts they should improve. To help them "to see" and to confront other experiences and expertise.
	We never had any phonecalls with Management Board (except you on skype) but we had exanged [sic.] mails with X, Y or Z [key members of the PMB]... and those were helpfull. Exchanging on glasscube comments about tasks was also helpfull.

Where the 'Follow-Up Calls' were evaluated less positively ('Moderately' or 'Neither Helpful nor Unhelpful'), it seems that Partners were either confidently on track (and therefore not requiring further clarification about any issues), the calls took the form of 'check-up calls' with few substantive issues addressed, or there were language barriers to communication. One neutral response was a consequence of the simple fact that the Partner had not actually taken part in a Follow-Up Call (and therefore not in a position to make a judgement). For one respondent the value of the Follow-Up Calls was not obvious as they received limited 'formative feedback' (only that they were doing very well). It also seems that the perceived quality of the Follow-Up Call partly depended on which member of the PMB was conducting them, with some named individuals providing excellent support whereas the communication provided by one particular individual was not evaluated as being particularly supportive. The issue relates to the involvement in the process of the PMB member who was required to step down from the PMB (discussed above and relates to Footnote 1).

5.7 Project Co-ordination, Administrative Support and Participants' experience

Participants expressed a clear and unambiguous liking for being involved in the project, throughout its duration. The Survey question: "Overall, are you satisfied with your experience of being a Partner in the INQUIRE Project?" (Phase 1 - Survey 1 Qu5 n= 21; Phase 2 – Survey 1 Qu4, n=16) elicited an overwhelming 'Extremely satisfied response' (Phase 1 - 76.2%'; Phase 2 – 87.5%) with no negative responses in either Phase. Coordination provided by the PMB and administrative support, the latter undertaken principally by BCGI, was considered to be excellent across both phases and very well appreciated by Partners. Partners had a good understanding of the overall rationale of the project and, where queries arose, responses were rapid and informative. The structure of the work, as set out in the Work Packages, was logical and methodical. The project achieved its milestones and deliverables by the due date, with one minor exception – D4.2, which was quickly completed to meet a revised deadline. All other deliverables were delivered on time.

5.8 Communication across the Partnership

A significant challenge presented to the Management Board and PI was the international nature of the project, which gave rise to a wide range of divergent characteristics across the Partnership, such as educational systems and curricular. A notable issue in this respect was 'Health and Safety', which arose during Phase 1, (notably at the preliminary Partnership meeting at Wakehurst Place, UK which the External Evaluator attended) with different national contexts having different levels of expectation. A decision was made at this meeting to work to a shared set of criteria that could operate across the whole Partnership. However, this was unpopular with some Partners because it was perceived to be unnecessarily rigorous in their particular contexts. It is interesting that Health and Safety was removed from the Final Course Handbook, which suggests that this issue remained 'live' throughout the project. Similarly, the variation in language skills in English, the principle lingua franca, meant that those

Partners with relatively limited proficiency in English sometimes felt less able to communicate. One interview respondent (Phase 1) indicated that a relative lack of proficiency in English might account for the limited uptake of support mechanisms, particularly academic support, by some Partners:
"We didn't contact academic Partners and that is something we might have done more often. [But there is also an language issue because] it is more difficult to express themselves [other national Partners whose language skills are limited] in English. So that is actually a barrier that prevented closer interaction with academic Partners."

A Phase 2 survey response (Phase 2 Survey 1 Qu10) also noted language issues impacting on the development of a shared understanding across the Partnership (with diverse and sometimes new vocabularies associated with IBSE), and the necessity to undertake a lot of translation work – more onerous for those with lesser language proficiency in English.
"In some (few!) cases, some issues related to language misfit meaning or interpretation and the work of the "non-native language" Partners is the double, yet, also the products !"

However, it must be acknowledged that all Partners were asked, before the grant agreement was signed, whether they required additional money for translation. The PMB was aware of this issue right from the start and allocated additional subcontracting money to those Partners who said they needed it.

This same issue relating to language was identified as one of the reasons for a qualified response to the effectiveness of one of the support Follow-Up Calls, where the caller and recipient spoke different languages (see above).
"As W [academic in the Partnership – who stepped down – see Footnote 1] had problems with English [sic.] it was U [Partner] who did the questionning. I had NO help from that."

Once again, the PMB managed these tensions well and a number of respondents indicated that the language issue had been largely overcome. for example, Phase 2 Survey 1 Qu10 survey responses included:
"… I think the language issue is fully resolved. …"
"… In my opinion, language is not a problem ..."

Communication across the Partnership was perceived to be generally, if not consistently, good. The Glasscubes system (Project handbook, Grant Agreement Annex1,p.68) proved generally good at promoting communication across the Partnership and provided a channel of sharing information and materials. One Partner questioned the 'user friendliness' of the system and, similarly, a Phase 1 interview respondent said:
"I had a small comment about the project management side, particularly related to Glasscubes. We don't like that project management tool too much. We find it rather confusing. When you want to go and find something on Glasscubes its always quite a nightmare. I understand that we need a project management tool."

This was not a perception, however, that was shared by the majority of Partners. And although such views about 'social networking' systems utilised in large-scale international projects are not uncommon, there are no obvious alternatives to these systems.

The Phase 1 Survey 1 Qu10 specifically asked respondents to rank their preferences. The results were as follows:

Table 7: Ranked responses to preferred communication channels

Channels	Ranking					Response Count
	1st	2nd	3rd	4th	5th	
Glasscubes	33.3% (7)	**38.1% (8)**	9.5% (2)	14.3% (3)	4.8% (1)	21
Skype	0.0% (0)	5.3% (1)	5.3% (1)	36.8% (7)	**52.6% (10)**	19
Email	**30.0% (6)**	20.0% (4)	**30.0% (6)**	15.0% (3)	5.0% (1)	20
Telephone	5.0% (1)	20.0% (4)	25.0% (5)	15.0% (3)	**35.0% (7)**	20
Face-to-face meetings	**52.4% (11)**	23.8% (5)	14.3% (3)	9.5% (2)	0.0% (0)	21

Most popular were 'face-to-face' meetings, followed by Glasscubes. Skype and telephone calls were the least favoured modes of communication.

This question was not repeated in the Phase 2 survey, but comments in other parts of the survey did provide further insight into Partners' continuing perceptions of the channels of communication. For example, two comments in the Phase 2 Survey 1 Qu10 indicated that Glasscubes proved particularly valuable for document sharing and collaboration:
"…It was good that we were able to use Glasscubes in the project.This gave us access to all the project documents, ensured that all information as distributed on time and gave us the opportunity to see our Partners' reports, which I found very valuable"
"Organisation of the project from the very beginning enabled good communication between Partners. Partners' Meetings helped us to meet and know each other. The system Glasscubes is a great opportunity if it is necessary to communicate on current issues. Putting the details (email, phone, etc.) is a convenience by which we can collaborate on topics that are not directly related to the operation of the project, but are part of the work in Botanic Gardens."

A particular comment related to Phase 2 Survey 1 Qu10 provided a good description of how new media and digital technologies have enhanced the international collaboration across the project:
"Long-distance collaboration is really easy nowadays (Skype, Glasscubes, emails, etc.). Sharing experiences, ideas and resources was really enriching and it was especially easy thanks to the Partners Meetings and Glasscubes (a very useful tool). In my opinion, language is not a problem. The

main difficulty for our organisation was to attend international conferences and carry out activities along with other Partners. The financial cuts we are experiencing make it impossible. We would have loved doing it."

Similarly, a Phase 2 Survey 1 Qu8 comment indicated that perhaps Skype could have been a useful tool throughout the project:
"Maybe the skype calls routine should have been from the beginning"

One comment in the Phase 2 Survey 1 Qu10 also provided a positive comment on the INQUIRE website:
"The shared resource based accessible via the INQUIRE website was an important source of procedural and methodological information for us and our course participants. The multi-lingual website also helped to spread the project and its capabilities: it was not only a source of information about the project, but also became an important teaching resource."

However, another respondent in the same survey said:
"Sometimes we doubted the usefulness of the newsletter and website as communication tool."

As noted above, a particularly valued dimension of the INQUIRE Partnership was its face-to-face Project Meetings. In response to the survey question: "Overall, are you satisfied with INQUIRE Project Partner meetings?" (Phase 1 - Survey 1 Qu7, n= 21; Phase 2 – Survey 1 Qu5, n=16) an overwhelming proportion (Phase 1 - 71.4%; Phase 2 – 81.3%) indicated that they were 'Extremely satisfied' and, once again, no respondents said they were 'dissatisfied'.

5.9 Workload and Structure

Tasks and deadlines proved to be generally achievable within the timescales set. Participants were mainly aware of these well in advance and were able to plan in order to achieve them. Occasionally, however, new tasks were set with a very short timescale to achieve (e.g. under two weeks). This was identified in the online survey as an area for potential improvement for the Project Management Board (Phase 1 Survey 1 Qu 3):
"Overcrowding of too many tasks at times short advance notice for some tasks, even if tasks are short and quick, a reasonable advance notice should be provided particularly at busy times of the year. People also have other commitments. In few circumstances contradictory indications were provided and some products were delivered too late (e.g. initial questionnaires)."

This point was also raised in Phase 2 Survey 1 Qu10:
"The work to do with the project was intense and with many tasks with short deadlines, most of the times. So, the good oportunities [sic.] of collaborative work with Partners were concentrated in the meetings, that were well organised and developed, but there was more presentations of each Partner

work, than new IBSE case studies to be constructed by the different Partners, as a team work.
"Time constraints: We have the feeling more could have been collaborated with our international Partners but this was rather due to our lack of time than to a lack of the organisation."
"It remains - the 'time' problem, which is related to the specific professional workload."

This theme was also mentioned by other survey respondents. The respondent quoted above elaborated on this theme during a Skype™ interview during Phase 1:
"And also, there's another minor point, I made that point, when setting deadlines and setting tasks I think they need to be set in some time in advance. I mean a minimum time. It is true that some tasks have been set with only three days notice before the deadline, or one week notice before the deadline. It is true that they were very small tasks that might have been fulfilled in 10 minutes so I know why they did that. But we do also have other commitments. …"

However, this respondent was a lone voice among those interviewed.

Participants sometimes found it difficult to discern the type of task (its level of priority and/or the amount of work involved). Some Partners suggested that more thought might have been given to the design of deliverables to provide less work and more time for Partners to prepare for them. Consequently, one of the recommendations of the Interim Report was:
"Where possible, any news tasks should be set with at least a two week turnaround to achieve. Furthermore, a system of 'flagging' the nature of the task in terms of 'priority' (e.g. high, medium, low) and time/amount of work involved (e.g. extensive, medium, minimal) might be helpful."
(Morgan, 2012, 7)

Efforts were made by the PMB to address this recommendation. As far as possible, adequate notice was provided in the run-up to tasks, although this was not always feasible. Furthermore, as an additional support strategy, the PMB used Follow-Up Calls to keep Partners 'on track' by providing specific guidance and support (see above).

5.10 Academic Input

Partners appreciated the input of Academic members of the Partnership. Supporting materials were positively received. For example, in answer to the Phase 1 survey question: "How helpful have you found the resources provided to you such as 'ideas for investigations'?" (Phase 1 - Survey 1 Qu6 n= 21), the most popular answer were 'very' (47.6%) and 'Moderately' (33.3%) respectively. Although only 14.3% answered 'Extremely', there were no 'Unhelpful' responses.

6. Partners' effectiveness

This dimension of evaluation is concerned specifically with Partners' participation in, and contribution to, the Partnership, at the level of individuals and organisations. As a general comment, it can be safely stated that Partners have engaged with, and participated in, the life of the INQUIRE Project enthusiastically and fully. They have benefited greatly at the individual and collective levels in terms of their understanding of the theory and practice of IBSE. Furthermore, they have developed as an effective CoP, which demonstrates critical reflection and a willingness to progress the legacy of the INQUIRE Project into the future.

6.1 Partners' participation in Project

The question "To what extent to you think you have been able to regularly engage in an active and collaborative manner with the activities of the INQUIRE Project?" (Phase 1 Survey 2 Qu5; Phase 2 Survey 2 Qu5) elicited the following responses:

Table 8: "To what extent to you think you have been able to regularly engage in an active and collaborative manner with the activities of the INQUIRE Project?"

Responses	Phase 1		Phase 2	
	%	n=17	%	n=13
Extremely regularly	17.6%	3	0.0%	0
Very regularly	58.8%	10	46.2%	6
Moderately regularly	17.6	3	53.8%	7
Not very regularly	5.9%	1	0.0%	0
Neither regularly nor irregularly	0.0%	0	0.0%	0
Very irregularly	0.0%	0	0.0%	0
Extremely irregularly	0.0%	0	0.0%	0
Answered question		17		13
Skipped question		0		0

While direct statistical comparisons are inappropriate between the phases of data collection, it is interesting to note the significant reduction in positive responses (i.e. from 17% to 0% – Extremely regularly; 58% to 46% Very regularly) and the commensurate increase in the proportion of 'Moderately' responses (17% to 53%). This suggests that factors in the latter half of the operation of the project have increased the challenge among Partners to contribute, although it is difficult to discern the extend to which these are external to the project.

The question "Have you been able to meet deadlines for delivering materials requested by the

Management Board (e.g. formal 'Deliverables')" (Phase 1 Survey 2 Qu7; Phase 2 Survey 2 Qu7) elicited the following responses:

Table 9: "Have you been able to meet deadlines for delivering materials requested by the Management Board (e.g. formal 'Deliverables')?"

Responses	Phase 1		Phase 2	
Always	23.5%	4	38.5%	5
Nearly always	52.9%	9	38.5%	5
Mostly	23.5%	4	23.1%	3
Sometimes	0.0%	0	0.0%	0
Never	0.0%	0	0.0%	0
Answered question		17		13
Skipped question		0		0

This time, the situation appears slightly reversed in that there is a greater proportion of more positive answers (Always) in Phase 2 Responses (38%) vis-à-vis Phase 1 (23%). The Mostly category represents a comparable proportion of responses.

The question "How effective do you feel the course you have designed for your particular site/context for addressing the overarching aims of the INQUIRE Project?" (Phase 1 Survey 2 Qu8; Phase 2 Survey 2 Qu8) elicited the following responses:

Table 10: "How effective do you feel the course you have designed for your particular site/context for addressing the overarching aims of the INQUIRE Project?"

Responses	Phase 1		Phase 2	
	%	n=17	%	n=13
Extremely effective	11.8%	2	15.4%	2
Very effective	47.1%	8	69.2%	9
Mostly effective	41.2	7	15.4%	2
Neither effective nor ineffective	0.0%	0	0.0%	0
Mostly ineffective	0.0%	0	0.0%	0
Very ineffective	0.0%	0	0.0%	0
Extremely ineffective	0.0%	0	0.0%	0
Answered question		17		13
Skipped question		0		0

It is very encouraging that the proportion of most positive responses (Extremely and Very) had increased between phase 1 and 2 surveys. This suggests that considerable progress had been made in the latter half of the project in terms of participants efforts to create and adapt INQUIRE courses which met the objectives of the INQUIRE project and were informed by an enhanced understanding of IBSE; and that participants perceived their contribution to the project (and by implication the knowledge and practice of IBSE within their specific contexts) to have improved throughout the latter part of the project. These represent major goals of the INQUIRE Project which have been achieved.

As with the Phase 1 survey, Partners were asked to respond to the following open question (Phase 2 Survey 2 Qu9): "On reflection, what would/will you change in terms of your site-specific course in order to strengthen its effectiveness? (max 300 words)". This elicited a range of detailed and sophisticated responses which were characterised by critical reflection and a range of positive suggestions to further enhance course design and delivery (e.g. more outdoor learning; reconsider when theory is introduced; attempt to build personal relationships/COP from outset; timings of courses and sessions). Such responses indicate that project Partners continued to engage with, participate in, and contribute to, the INQUIRE project in a positive manner throughout its lifespan. Critically reflective responses included:

"… Begin with more practical exercises and leave the theory until the winter."

"During the course itself we have made many changes to the original plan and altered the course structure by increasing the number of practical sessions and giving the teachers more theoretical training.."

"… it should be run in a regular annual format, as trainer for the trainers (teachers and educators) individual course, generating a annual pool of new IBSE projects, alternative and motivating ways for the biodiversity and climate changes curricular programs study, for teachers, educators and students. Moreover, the INQUIRE course should be integrated in the first curricular year of the [Botanical garden specified] , on the Biology and other connected Natural Sciences superior courses, linked to a curricular discipline of conservation, botany or science education."

(The latter part of this comment suggests that, in this context at least, the whole INQUIRE Project ethos and goals were recognised to be valuable and desirable educationally beyond the target audience of school teachers and educators working in the 'Middle Years' periods between primary and early secondary i.e. the benefits were identified as being relevant and desirable even at undergraduate level)

"We put to [sic. – read as 'too'] much content in it in relation to the time frame. Therefore we selected the course-contents more carefully and granted our participants more space and time to work autonomously."

"We will offer some regular teacher meetings to build a community of practise. We will encourage the participants of the next course to produce new modules. We will convince teachers of the effectiveness of the IBSE method, if they will aplly [sic.] it regularly, because as soon as the students are used to the method, they would ot need that long time, that they need if they are not used to the method. We are going to give the participants tasks to fulfill [sic.] at school, trying out the IBSE method."

"I would probably include more sessions. In the final questionnaires some teachers have commented ´I´ve liked the course and I would like more´".

6.2. Challenges presented to, and overcome by, Partners

A particular strength of the INQUIRE Project/Partnership/COP has been the high degree of motivation and commitment demonstrated by participants which has permitted this progress and impact to occur despite the considerable challenges and constraints presented to Partners which have made participation in, and contribution to, the project difficult at times. A key survey in this respect was 'Phase 2 Survey 2 Qu6' which required respondents to provide a qualitative answer to the open question "Can you briefly describe the principle difficulties you have faced in terms of your active engagement with the project (and the extent to which you have been able to overcome them) (max 300 words)" (all responses below are drawn from this question unless otherwise indicated).

For many Partners, challenges associated with time and cost constraints were substantial given that participation in the project was over and above existing work commitments. For example, some Partners felt unable to devote adequate time to activities and the preparation of paperwork, working more within a 'just in time' frame:
"I waited until the last days with deliveries. They came on top of the normal work, and had to be done during evenings. …"

For some, the challenge has been to assimilate and incorporate the wealth of new theoretical information on teaching and learning theory, as the following comment illustrates (Phase 1 Survey 2 Qu6):
"The major difficulties were to put in practice all the theoretical knowledge we received either from the meetings or from the bibliography we read. Mainly because we have had no particular research activities on this pedagogical method."

Even when this was achieved, participants were then challenged to 'cascade' this understanding to colleagues:
"It was difficult to communicate the idea of IBSE to the Garden staff involved in the project."

A similar challenge was presented in terms of 'learning' about the specific modes of operation of the INQUIRE Project/Partnership itself, which involved working with new information, procedures and tools specific to such a complex project. This challenge was compounded for non-English speakers and those with fractional contracts and/or multiple roles:
"At the beginning it was difficult to grasp the underlying concept and specifics of IBSE and the INQUIRE project.
Difficulties with certification of the course: the certification process is quite time-consuming and very bureaucratic, and we have still not managed to complete it.

It was hard to navigate the abundance of material available in the various websites and to select the most interesting and relevant. The language barrier was also an issue, of course […].
It was hard learning to use the website (uploading information to the site), as I had no previous experience of this."

However, it is important to note that the comment relating to certification involved a matter determined at the national level which was not under the control of the INQUIRE Project.
"As I started my work here I had no idea about the project structure, the aims, the tasks etc. In a short time I had to find in in all of this. Besides my work in the green school, I had to work also in our exhibition. So there where a lot of new things for me to learn. I think when I have had a full time job in INQUIRE it had been easier to engage more active in the project."

Another challenge was presented to participants in terms of the overt training rationale of the project, which did not represent a major focus of their roles prior to the project. There was also the associated challenge of catering for a diversity of trainees' needs, many of whom were unfamiliar with IBSE and the constructivist/student-centred rationale upon which it is based. In addition, Partners developed an understanding of how to facilitate CoPs in their training course – they established shared leadership in the course and provided support for participants to learn from and with each other. This represented a major goal of INQUIRE:
"As the project is intended to organise and carry out trainings, my major difficulties were precisely in thus field. In presenting the concept of 'Inquiry Based Science Education' to the practitioners I was faced by two different reactions (excluding the practitioners, who came with enthusiasm and interest): Part of the participants claimed that what they were doing was entirely clear to them and there was nothing new for them to learn during the training. These were practitioners who often conducted experiments, presented interesting information to the students and had the confidence of being good professionals. With these people we worked to make them understand and apply the IBSE cycle. I challenged them to put their students in the role of planning experiments on their own, as well as to do research and offer solutions of their own i.e. to step out of the role of observers (though of interesting things), and be active. Others insisted the approach was absolutely unclear and, therefore, inapplicable. In this case we were supported by representatives of the above group who explained the role of practical training classes in the learning process. We worked with them on mastering the skills of posing enquiry questions. At the end of each course, it inevitably turned out that we had gotten over these difficulties for good during practical sessions via the development of lessons by the teachers, and through their team work."

Similarly, the expectations of participating teachers in some contexts did not match, initially at least, the requirement to 'actively' develop their own materials:
"One difficulty was, that our teachers are used to be delivered with modules from the [S – Partner organisation] thus they were not willing to produce their own modules, so we developed modules and they tried them out. Afterwards they discussed the adaptability and made some suggestions for

changes. When we were applying some modules with school classes, we just could do some small IBSE units, because IBSE takes more time. When teachers visit us with their school class, they want us to work on as much contents as possible. They are pleased, when the students have "Hands on activity" but instructed. If we are applying IBSE they need too much time for discussing and building hypothesis."

Even the necessary recruitment and retention of trainees/course participants was challenging, whether they were botanical garden colleagues or teachers:
"Initially there were some difficulties attracting teachers to the course, as the suggested method of using the website did not work"
"The most difficult was to find enough course participants and once the course was running, to convince them about the effectiveness of the course. Some people left the course, but those who stayed, were very collaborative and enthusiast about the course and the method."

This issue was addressed in the Consortium meeting in Spain and the INQUIRE Project participants discussed different approaches to overcome this problem.

A further difficulty was finding support inside Partners' organisations. It seemed to represent a major challenge to the employment regimes in the botanic gardens sector, where teams might be very small and colleagues have multiple roles and responsibilities. Recruiting or identifying colleagues with whom to nurture a collaborative working relationship, and also to retain them, can be problematic with limited funding.
"The principle difficulty was to get some people to help me in my work, as I was the only person in Educative ['C'] Garden team (!?) at the moment of the project starting date. In parallel, I have other professional attributions to fulfill in the Garden and it was not easy to organise, to reconcile and to respond to all the tasks. After a year, I got the volunteer help of three trainers to run one plenary session and the trainees' evaluation course, a contracting person for the web platform's management and a help of a person (my volunteer guide in the garden for a long time) for the outcomes registration and logistic documents and tasks help. Also I had in my charge all the administrative operations (fortunately not the administrative management!) what were very hard to be responded on the adequate time and did demanded a lot of time, work and worry. […]"
"I had problems with finding a "perfect" person to help me with conducting the project. When I at last found a fantastic and inspiring colleague, she got a full job just after half a year. After a while a found a new fantastic person, and now I am so sorry that when this project is finished I do not have any possibility to give her more job. It is really very hard to loose [sic.] her. And I haven't found any way to overcome this..."

Despite all these challenges, the positive feed back from participants and the demonstrable impact that the project had on individuals and institutions is testament to the motivation and commitment of project Partners, who contributed so fully to its continued success.

7. Project Impacts

7.1 Impact on participants' understandings, and practice, of IBSE

This dimension of evaluation is concerned specifically with the development of the individual Partners and their organisations' understandings and practices, of IBSE which represents a crucial potential impact[4]. There was, understandably, a range of levels of experience and understanding of IBSE exhibited across the Partnership at the outset of the project, from 'expert' to relatively novice. This is unsurprising given the relative novelty of IBSE in some national contexts, relative to others. This was manifested, in earlier phases of the project, in terms of some variation in the conceptual understandings expressed (i.e. through statements or posters) and the teaching and learning material produced – for example some Partners exhibited more 'transmissive' orientations to science education and learning. Given the above, the Partnership was set up, and developed, in such a way that the expertise and confidence of all Partners was significantly enhanced in terms of IBSE, with a focus on 'student-centred' models of teaching and learning.

The INQUIRE Project was underwritten by a concept of a 'community of practice and promoting continuous reflective practice' (INQUIRE Consortium, 2011, 5). Course participants have, according to the stated Project philosophy, been nurtured as 'Action Researchers' (INQUIRE Consortium, 2011). This is a methodological approach to research which lends itself well to the principles and practice of IBSE. These underpinning principles have been reflected throughout the activity of participants in each Partner's context and also among the project Partners themselves.

Strategic 'peer teaching' and 'peer support' input from, relatively, more expert Partners (including academics and more experience Botanical Garden educational practitioners); as well as more general avenues for intra-Partnership sharing of concerns and ideas have been key characteristics of the project. This has promoted an increasingly sophisticated understanding of, and practitioner skills in, IBSE for individual Partners and institutions. alongside the creation of an emergent CoP with a shared vision. 'Expert' input has included the provision and sharing of a selection of recommended resources (such as academic articles, existing manuals etc.) as well as the development of bespoke 'guidance' manuals together providing 'state of the art' input on IBSE. Additionally, opportunities for sharing experiences and expertise at Partnership meeting workshops, about how to operationalise such 'state of the art' thinking in specific learning contexts, particularly Botanic Gardens, have been highly valued. Some Partners felt that still more could be made of these opportunities, with greater resourcing for the project. However, this reflects the degree of enthusiasm generated by the project and its associated CoP, and not any shortcomings of the project itself.

These activities and process within the INQUIRE Project have contributed significantly to the

4. Judgements on the development of these aspects among course participants – i.e. teachers and non-partnership botanical garden educators – is beyond the remit of this External Evaluation.

development of a shared understanding of IBSE, albeit one which still allows for a range of interpretations. This is appropriate and to be expected since the concept of IBSE is notoriously difficult to define, as is the impossibility of promoting a single 'scientific method'. Accordingly, the statement "The INQUIRE project is based on a broad understanding of Inquiry-Based Science Education (IBSE) which takes into consideration the wide range of definitions of and approaches that exist." (INQUIRE Consortium, 2011, 7) has been supported throughout the project. However, it is important to recognise that the INQUIRE Project has espoused "an active, student-centred and student-led learning approach based on constructivist theories of learning" (INQUIRE Consortium, 2011, 9) and, therefore, more 'transmissive' modes of instruction are actually inimical to the shared understanding of IBSE that the project has sought to promote.

Consequently, the Preliminary report identified some evidence of transmissive modes of learning in some aspects of some Partners' work. It recommended the need for continued efforts to be made to support those contexts, where this was the case, to move towards more 'student-centred' modes. Evidence from materials produced by Partners and workshops, delivered at meetings and conferences subsequent to the Interim report, strongly suggest that this progress towards more student-centred modes has been very successful and is exhibited across the Partnership/CoP. This is evidenced by the sophisticated definitions of IBSE provided by Partners and the exemplar materials they produced in their contexts for use in the INQUIRE course and/or presentation at dissemination events (including the INQUIRE Conference).

The question "To what extent has your PERSONAL involvement in the INQUIRE Project enhanced or improved your personal understanding of Inquiry Based Science Education" (Phase 1 Survey 3 Qu2; Phase 2 Survey 3 Qu2) elicited the following responses:

Table 11: "To what extent has your PERSONAL involvement in the INQUIRE Project enhanced or improved your personal understanding of Inquiry Based Science Education?"

Responses	Phase 1		Phase 2	
Extremely	44.4%	8	64.3%	9
Very	55.6%	10	35.7%	5
Moderately	0.0%	0	0.0%	0
Slightly	0.0%	0	0.0%	0
Not at all	0.0%	0	0.0%	0
Answered question		18		14
Skipped question		0		0

These responses indicate that there has been a significant shift towards the most positive category: Extremely (44% to 64% between Phases 1 and 2) while no respondent chose categories below 'Very' in either phase. This is good evidence of the positive impact on the personal understanding of IBSE that involvement with the INQUIRE project has had.

Thus, as a consequence of involvement in the project, most Partners are now able to provide a quality definition of IBSE. Responses to the survey question: "In your own words, can you write a brief summary of your understanding of 'Inquiry-Based Science Education' (IBSE) (max 300 words)" (Phase 2 - Survey 2 Qu 3) includes the following representative examples:

"'Inquiry Based Science Education' – IBSE – is a method that puts teachers and students in a different situation. In order for it to be implemented in practice the teacher should 'grow out' of his role of standing in front of the class and saying irrefutable facts, and should learn to notice the individual skills of the kids and to have a sense as to when, how and to what an extent he should step in, as well as to develop assessment skills by watching a variety of competences, and analysing the situations in which they come to an expression. It is much easier for the students – through this method they have a chance to follow their inborn curiosity, seek and ask questions, make hypotheses and experiment, talk while they work, move while they learn, build a network of intra-object ties within their understanding of the world. To me IBSE is actually the only process of learning. It is only through it that the different types of intelligence are developed. It impacts social relationships, and builds personalities as opposed to puppets."

"IBSE is a new teaching methodology aimed at making the education process more interesting and creative for students, encouraging students to think and justify their actions, to acquire knowledge through personal experience and reflection as opposed to picking up abstract knowledge from textbooks, to think critically and formulate hypotheses, to independently devise activities to verify the hypotheses, to evaluate their knowledge, and to set new tasks aimed at individual self-development."

"IBSE offers students more responsibility and experience in exploring nature phänomenons [sic.]. Opposite to the common type of teaching in schools, students are allowed to make mistakes. This gives them the chance to reflect themselve and reduces fears in the learning process. IBSE provides space to develop logical and analytical thinking and also to develop personal interest in nature phänomenons. And IBSE ties in with the knowledge and cognitive skills of the students. To implement IBSE is a process where both, educationalist and students, have to learn what it means to teach more open. So there is no absolut IBSE, it depends on the experience in Inquiry-Based teaching. The lessons can be structured more and more open when the students are adjusted to IBSE."

Such definitions build on the already quite sophisticated definitions presented in the comparable question in Phase 1 (see responses provided in Preliminary Report). All of the 13 respondents to this question provided a definition based on constructivist and student-centred learning theory. Of course, it must be noted that some Partners did not participate in their survey and it cannot be assured that non-respondents also demonstrate such a sophisticated understanding of IBSE.

The overwhelming impression provided by respondents in questionnaire, survey and interview responses is that the greatest value of their involvement in the INQUIRE Project has been in terms of providing opportunities for critical reflection on the purposes of science learning and the provision of a framework (or set of frameworks) and a language through which to conceptualise more student-centred and active approaches to learning science. Thus, typical responses to the Phase 2 Survey 2 Qu4: "In your own words, can you say how your involvement with the INQUIRE Project has altered your understanding of Inquiry Based Science Education (IBSE) (max 300 words)" included:
"Inquire [Project] opened the possibility to have a different vision of how, how much and when to teach."
"My work on the INQIRE [sic.] Project undoubtedly has built upon my understanding of 'Inquiry Based Science Education'. And it is a process that took place in complexity: through reading literature, theories, discussions with Partners and trainings, and, of course, the challenges resulting from practice: the provocations from both teachers/trainers, as well as from students."
"The project has changed my way of teaching. Before I must admit I was a typical talking person, describing, showing, explaing [sic.] - but very seldom preparing excersises [sic.] that the students should perform themselves. It took me a year, I was afraid to loose [sic.] the controll [sic.] a bit in the start. Now I see that when I began to trust the IBSE methods they give more stimulating and interesting lessons in the Botanical Garden. …."
"…To be involved in the IBSE Project improved my personal understanding of teaching science. I try to not instruct the pupils as much as I did before. I start with a more open question or phenomenon, let the pupils discuss and build up their hypothesis. Afterwards I guide them through their investigations, but I am more in the background. Using this method we have more independent learners. Moreover I do more formative assessment during the courses."

Indeed, most now recognise that they were starting to explore IBSE-type pedagogies without recognising them as such, and now have the conceptual frameworks for understanding and implementing IBSE more robustly and successfully. For example, one Phase 1 interview respondent indicated:
"Yes. We were doing it without knowing any words to identify really well this approach but this project [Inquire] make us changing our way of working and we are trying to use IBSE in all our activities and all the projects of the Garden."

In addition to this information about understanding, the survey question "To what extent has your PERSONAL involvement in the INQUIRE Project increased your personal commitment to promoting Inquiry-Based Science Education in your work?" (Phase 1 Survey 3 Qu3; Phase 2 Survey 3 Qu3) elicited the responses seen in Table 12:

Once again, the proportions between phases are comparable, although there is a slight increase in the 'Extremely' category and an increase from 0 to 14% in the 'Moderately' category perhaps indicating a slight shift – either more or less positive – in the levels of individual commitment to IBSE, giving rise to a more even spread of responses.

Table 12: "To what extent has your PERSONAL involvement in the INQUIRE Project increased your personal commitment to promoting Inquiry-Based Science Education in your work?"

Responses	Phase 1		Phase 2	
Extremely	38.9%	7	42.9%	6
Very	61.1%	11	42.9%	6
Moderately	0.0%	0	14.3%	2
Slightly	0.0%	0	0.0%	0
Not at all	0.0%	0	0.0%	0
Answered question		18		14
Skipped question		0		0

7.2 Impact on Organisation's understanding of, and commitment to, IBSE

The question "To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective understanding of your organisation/staff of Inquiry-Based Science Education?" (Phase 1 Survey 3 Qu5; Phase 2 Survey 3 Qu5) elicited the following responses:

Table 13: "To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective understanding of your organisation/staff of Inquiry-Based Science Education?"

Responses	Phase 1		Phase 2	
Extremely	5.6%	1	7.1%	1
Very	72.2%	13	64.3%	9
Moderately	11.1%	2	14.3%	2
Slightly	11.1%	2	14.3%	2
Not at all	0.0%	0	0.0%	0
Answered question		18		14
Skipped question		0		0

Once again, the results between phases are comparable, although there is a slight shift towards the lower categories in Phase 2 responses. The 'Slightly' category features in both Phases, a more negative response. These results suggest that participants believe their organisation's involvement in INQUIRE has been positive overall, although less so for those not directly involved in the PP.

Similarly, the question: "To what extent has your ORGANISATION's involvement in the INQUIRE Project increased your organisational/collective commitment to promoting Inquiry-Based Science Education in

the work of your organisation?" (Phase 1 Survey 3 Qu6; Phase 2 Survey 2 Qu6) elicited the following responses:

Table 14: "To what extent has your ORGANISATION's involvement in the INQUIRE Project increased your organisational/ collective commitment to promoting Inquiry-Based Science Education in the work of your organisation?"

Responses	Phase 1		Phase 2	
Extremely	11.1%	2	7.1%	1
Very	55.6%	10	78.6%	11
Moderately	22.2%	4	7.1%	1
Slightly	11.1%	2	7.1%	1
Not at all	0.0%	0	0.0%	0
Answered question		18		14
Skipped question		0		0

Once again, all respondents indicated that their organisations involvement had had an impact to an extent with many choosing the most positive categories. Indeed, while direct statistical comparisons aren't possible, it is gratifying that the proportion of the highest responses (Extremely and Very) increased between Phases 1 and 2 (66.7% to 85.7% respectively).

7.3 Development of Multiple Communities of Practice

A major focus of the INQUIRE project has been the nurturing of CoP. These can be discerned at various levels.

7.3.1. Across the INQUIRE Partnership

The evidence suggests that a very strong, engaged and committed CoP emerged among the INQUIRE Partnership. Partners indicated, that individually and organisationally, through dialogue with other CoP members, they benefited greatly in terms of their own learning about IBSE and ESD and hope to continue collaborating. For example, open ended comments from Phase 2 Survey 1 Qu10 include the following responses:

"….. I really enjoyed the friendly and creative atmosphere of this project. There was no sense of competition or rivalry, but rather respect and a desire to find out what colleagues think of your ideas. It was a very creative, experienced and highly professional team. We became very close during the project and I hope we will continue to work together in the future."

"Due to an extremely busy spring we have not visited the [geographical indication] garden we thought of visiting conserning [sic.] lesson plans about insect hotels. But I feel that we will continue to stay in contact after the project ends, so we can do that this autumn or next year."

"[…] we hope that after the end of the project we will be able again to collaborate and work with some Partners in the future."

In both phases the following survey question was asked: “Given your experiences in the INQUIRE Project, would you be willing to engage with a similar initiative in the future?” (Phase 1 Survey 2 Qu10; Phase 2 Survey 2 Qu10). This elicted a largely very positive response, with comparable results in both phases:

Table 15: “Given your experiences in the INQUIRE Project, would you be willing to engage with a similar initiative in the future?”

Responses	Phase 1		Phase 2	
Extremely willing	64.7%	11	61.5%	8
Mostly willing	23.5%	4	30.8%	4
Moderately willing	11.8%	2	7.7%	1
Neither willing nor unwilling	0.0%	0	0.0%	0
Moderately unwilling	0.0%	0	0.0%	0
Mostly unwilling	0.0%	0	0.0%	0
Extremely unwilling	0.0%	0	0.0%	0
Answered question		17		13
Skipped question		0		0

While this question was not directed at continuing the INQUIRE CoP, per se, it does provide evidence of the Partners’ willingness to continue working together into the future. This was borne out by informal discussions with Partners.

The initial questions of Phase 2 Survey 4 related specifically to CoP development (there was no comparable survey undertaken in Phase 1). Question 2: “To what extent do you feel that your PERSONAL involvement in the INQUIRE Project has allowed you to feel part of an emerging COMMUNITY OF PRACTICE in terms of IBSE?” elicited the following responses:

Table 16: “To what extent do you feel that your PERSONAL involvement in the INQUIRE Project has allowed you to feel part of an emerging COMMUNITY OF PRACTICE in terms of IBSE?”

Responses	Response %	Response count
Extremely	23.1%	3
Very	53.8%	7
Moderately	15.4%	2
Slightly	7.7%	1
Not at all	0.0%	0
Answered question		13
Skipped question		0

The majority of responses were in the 'Very' category with the second most popular category being 'Very' with none in the 'Not At All'. It is important to note the more negative responses under the 'Moderately' and 'Slightly' categories. However, this presents a broadly positive set of responses.

Similarly, Phase 2 Survey 4 Question 3: "To what extent do you feel that your PERSONAL involvement in the INQUIRE Project and the emerging COMMUNITY OF PRACTICE has enhanced your EFFICACY (or effectiveness) as a practitioner of IBSE?" elicited the following responses:

Table 17: "To what extent do you feel that your PERSONAL involvement in the INQUIRE Project and the emerging COMMUNITY OF PRACTICE has enhanced your EFFICACY (or effectiveness) as a practitioner of IBSE?"

Responses	Response %	Response count
Extremely	30.8%	4
Very	69.2%	9
Moderately	0.0%	0
Slightly	0.0%	0
Not at all	0.0%	0
Answered question		13
Skipped question		0

This time the positive responses were more obvious, with the spread of responses being contained in the top two categories. Together, these questions suggest that participants in the INQUIRE project developed an empowering identity as part of an emerging CoP as a result of their involvement.

Phase 2 Survey 4 Question 4 sought to establish more qualitative responses to these two question through the open-ended question: "Please provide a brief explanatory comment on your answers to questions 2 and 3". Responses varied in terms of their level of positivity.

Largely Positive:
"At the beginning of the project I didn't understand IBSE, but eventually, somewhere after the half-way mark, having worked as a team with the Partners and participated in the discussions and workshops, it became clear. This was largely thanks to the active engagement between the Partners, our discussions and joint preparation of materials. This feeling of Partnership was fostered by the atmosphere of joint creativity in all the meetings. There was no sense of competition or rivalry or of being "talked down to" by a teacher: everybody participated on equal terms and we learned from one another. […]"
"With the involvement in the Inquire project, new communities of practices emerge: between the Partners, between the trainees, the trainers and among all. It was possible for me to better understand, consolidate and get very good fundamentation [sic.] and support for a better and confidante [sic.] use of this methodology in the garden outdoors education. […]."

Relatively Negative:
Where such comments were identifiable, they were often a consequence of limited time as part of the PP as a consequence of coming later to the project.
"Doesn't feel as part of a community of practice, we hadn't time to exchange so much, to [sic.] many other priorities..; But having ideas and activities from other Partners helped us to have a better understanding of IBSE. Now we try to include IBSE in the creation and the implementation of projects and activities of the garden."
"I think, I needed some time, to feel a part of this Community. To a certain extent, I had been at the periphery for a long time due to the fact I am not a professional botanist which makes it difficult for me to always gain insight on some of the topics. At the same time, in [national context indicated] , I worked namely in the direction of establishing such a society of practitioners. Teachers and trainers expect a feedback from me, specifically, in terms of methodology, work in the open, modulation of group processes etc., thus, I feel I belong here. In the meantime, I face a challenge in the fact that I urge the training participants to bear in mind the importance of the correct scientific concepts, while, along with (aided by extensive reading) them we follow the road of evading wrong concepts. After describing this personal process – at present I feel part of the community of practitioners, clearly and consciously knowing this position is not a static, but rather a developing one."

These comments reveal the importance of time in developing a CoP, but also personal factors such as 'professional identity', self-efficacy and confidence in communication (related to language proficiency but also the professional vocabulary of science, science education and IBSE). Where sufficient time, opportunity for involvement, participation and collaboration within a spirit of open communication and mutual learning are in evidence, a positive CoP identity is engendered. This appears to have been the case for the vast majority of Partners in the PP of the INQUIRE Project. Where these characteristics are relatively absent or there are barriers (such as joining the community later; language barriers and identity mismatches), the CoP identity and commitment will be less well formed. Indeed, the last sentence of the final comment reveals that participants noted this crucial time dimension in their critical reflection, suggesting that these constraints could be considered as providing the basis for positive development.

7.3.2. CoP at Institutional/Organisation level

At the institutional/organisational level, participation is recognised as having been significant in terms of creating an 'appetite' within the organisation for IBSE. For example, in response to Phase 1 Survey 3 Qu 7:
In my personal perspective, I think my Organisation was enhanced with this project. The proof is the positive feedback we are having relative to the 1st 'XXX' INQUIRE Course 2012 and the Trainer for the trainers last workshop. Participants found this methodology and experiences very interesting and the trainees already showed some outcomes of their projects with the students, reflecting good experiences on IBSE methodology application and sharing. There was also a very positive commitment of teachers, educators and students, their parents and in some cases also the involvment of the community outside

the school, not only collaborating in the project but also improving biodiversity conservation actions. There are 22 participants (16 teachers and 6 educators) preparind their projects presentations and assessements; more than 20 people participated in the Trainer for the trainers workshop and were very much engaged and interested to try to apply the second 'XXX' INQUIRE Course - 2013.

Similarly, another respondent said:
"Several people from my organisation's staff was involved in the INQUIRE project or INQUIRE course, and they are all very interested in applying the method and also to help teachers to apply the method to their own students."

The question "To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective understanding of your organisation/staff of Inquiry-Based Science Education? (Phase 1 Survey 3 Qu5; Phase 2 Survey 3 Qu5) elicited the following responses (Table 18):

Table 18: "To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective understanding of your organisation/staff of IBSE?"

Responses	Phase 1		Phase 2	
Extremely	5.6%	1	7.1%	1
Very	72.2%	13	64.3%	9
Moderately	11.1%	2	14.3%	2
Slightly	11.1%	2	14.3%	2
Not at all	0.0%	0	0.0%	0
Answered question		18		14
Skipped question		0		0

Table 19: "To what extent has your ORGANISATION's involvement in the INQUIRE Project increased your organisational/collective commitment to promoting IBSE in the work of your organisation?"

Responses	Phase 1		Phase 2	
Extremely	11.1%	2	7.1%	1
Very	55.6%	10	78.6%	11
Moderately	22.2%	4	7.1%	1
Slightly	11.1%	2	7.1%	1
Not at all	0.0%	0	0.0%	0
Answered question		18		14
Skipped question		0		0

Similarly, the question: “To what extent has your ORGANISATION's involvement in the INQUIRE Project increased your organisational/collective commitment to promoting Inquiry-Based Science Education in the work of your organisation?” (Phase 1 Survey 3 Qu6; Phase 2 Survey 3 Qu6) elicited the responses in Table 19 (above).

These responses broadly suggest that within Partners’ organisations a general understanding and commitment to IBSE was developed, which could form the basis for an organisational CoP.

The Phase 2 Survey 4 Question 5; “To what extent do you feel that your ORGANISATION'S involvement in the INQUIRE Project has actively contributed to the development of a COMMUNITY OF PRACTICE across and beyond the project Partners?” elicited the following responses:

Table 20: “To what extent do you feel that your ORGANISATION'S involvement in the INQUIRE Project has actively contributed to the development of a COMMUNITY OF PRACTICE across and beyond the project partners?”

Responses	Response %	Response count
Extremely actively	15.4%	2
Very	46.2%	6
Moderately	30.8%	4
Slightly	0.0%	0
Not at all	7.7%	1
Answered question		13
Skipped question		0

This represented a mix of responses from very positive (Extremely and very active) to very negative (‘Not at all’). The subsequent Phase 2 Survey 4 Question 6 sought to elicit qualitative responses to this question by asking the open ended question: “Please provide a comment to explain your answer above - perhaps you are able to describe specific strategies that your organisation has employed to support the development of a Community of Practice among INQUIRE Partners and/or among the collaborative participants (teachers etc.) in your region”. This elicited the following comments:

Positive:
“[…] Lessons devised by Garden specialists, adapted for IBSE and tested during pilot course, will be placed on the Scientix website in the near future. We are promoting IBSE at botanic garden conferences and meetings in [context specified] and abroad (presentations, workshops). Ideas for new lessons, techniques and question setting very often arise during discussions with teachers and this has resulted in an atmosphere of joint creativity. […]”
Mixed (Positive and Negative):
“With the INQUIRE project we were mainly concerned with our own regional/national problems and not

precisely with the problems that other Partners faced and their proposed solutions. This is because the project is mainly focused on the development of teachers courses which, in part, enables a true reflective practice among Partners."
"We have not worked on the building of a community of practitioners within the Project, as we felt a well -functioning Community already existed and we simply joined in. Nevertheless, we think we actively participated in the meetings, and this is of undoubted benefit to us. We appreciate sharing our experience and exchanging the ideas we got from Partners, and find them beneficial and constructive. What seems to be our strategy, regionally, is taking up the experience of our Partners, and sharing it with the participants in the trainings in this country. Thus, during the Course in 2012/13, at the meetings to discuss the development of reflexion skills, we actively invited participants from the pilot INQUIRE Course. As of the present moment, we have received an enquiry from our participants from [local cities mentioned] (cities divided by over 500 km) to organise a meeting in order for them to meet, and we are now contemplating the opportunities to make this happen. We plan to continue to provide the opportunity of electronic discussion also after the end of the Project."

7.3.3. Extra-Partnership (Local/Regional) CoPs

A particularly powerful 'added value' of participation identified by some Partners is the strengthening, or even development of, new, 'local' or 'regional' CoP. Thus, one Phase 1 interview respondent reported that:
"It's the first time in the region that they [teachers and botanical garden educators, and academics] can meet together and work together and exchange tools together and even making the course and secondary and primary teachers is the first time for them and its very nice for them because they can make lots of changes."

The same interviewee said later in the interview:
"... It was very good for us to create links with school authorities. This is the very important thing for us because before this project we haven't made any links with school authorities and now we are very well identified at the academies as a scientific organisation and a pedagogic education and we are involved to receive all the classes as well who are sent by the academy. That gives a new project for us and the teachers. And for the teachers the impact of this project is very nice because of the 15 who were present at the last day they all said they are all going to do this project again and they are going to make some changes to make it better and they are going to do IBSE with their class."

There is already an emerging body of evidence across the INQUIRE Partnership of possible 'impact', particularly in terms of participating teachers. Some Partners were able to provide anecdotal evidence while others provided 'testimonial' evidence.

The latter included the following:
"Here's my lesson and how it turned out (it was pretty amazing!)."
(Participating teacher – web-based blog spot provided)

“I'm able to apprehend that the students which were submited to the IBSE method have developed more curiosity towards the environment that surrounds them and were able to question this reality and choose a path that leads them to the answers."

(Teacher)

"The success of our two classes increased (we had grades above the medium average of the schools group), but more important was the commitement of students and parents in the activities that we developed afterwards on the surroundings of the school. Next year we have to think about on how to maintain the project."

(Teacher)

Other types of added value were discernible for some Partners. One Partner described how they were transferring their enhanced understanding and practice of IBSE to their educational work with Higher Education (i.e an educational phase not the focus of the INQUIRE Project):

”For my side I can tell you also that being an Higher Education teacher and professor I have been trying to modify completely the way of giving my classes at university, not only here at University of ‘XXX’ but also outside where I have been giving lectures in ‘XXX’ and also information and intensive course formation of teachers here at ‘XXX’. So in a way I have been changing my way of giving my classes …”

“Because I used to give expository lectures but always trying to push the students to put questions. But most part of them never talked. And now I’m with the enthusiasm to give the subject that I have to fulfil, I always presenting my slides. And now I make a kind of stop and a small questionnaire where they have to reflect on the things that I have been teaching and giving in a way that they reflect and they look for more things about the things I have been trying to offer. Of course I am teaching botany or ecology so it is ... of course, it is only two or three days intensive course but even that, and to teachers to or higher education students, but even for that I felt much better changing the way of giving the classes and putting some other kind of exercise for them to fulfil after the classes.”

The course is also bringing benefits beyond science education. For example, one Partner is now working with Geography teachers on Inquiry (or Geographical Enquiry).

Collaborations have been developed with extra-Partnership professionals, including academics both within and beyond their institutions. For example, one respondent indicated that they are cascading IBSE across their university:

“I made an analyse of how – or if – the INQUIRE project had had any impact on our organisation (NHM). And also if the awareness of IBSE have become known at the other departments af our organisation. We are a big Natural History Museum with 6 different departments (geology, zoology, botanic garden etc) and even if there are information on our website and we have the course in the garden, the awareness in the museum as a whole is interesting to analyse. 8 of 25 randomly selected employees had never heard of the project. 10 of the 25 had no opinion on whether such a project had any significance for our organisation. I can send you the results if you want. I just presented it at EuroGard VIth congress this week.”

Similarly, interviews revealed that there is internal collaborating among University colleagues at a number of contexts. These clearly represent opportunities for wide dissemination beyond the Partnership.

Potential impact is also discernible in terms of Regional & National levels with some Partners having opened up communication with regional and even national policy makers with a view to enhancing the provision of IBSE within their jurisdictions through Partnership. Thus, one Partner has been working towards promoting IBSE within the the sub-national region within which they are situated, another Partner has been working with a national exam board, and yet another has attempted to develop a nationwide programme of teacher training. However, this latter effort is directed as a 'grass roots' level due to perceived difficulties of operating at Ministerial level.

The Phase 2 Survey 4 Question 6 also provided relevant comments:
"Through the TtT seminar we made connections between many educators from various organisations throughout the whole country which teach natural science. At the seminar we let the participants learn to know an IBSE way of thinking through practice, we got the opportunity to discuss dissemination practice and learn to know each other, both organisations and on a personal level. The seminar was much appreciated and will probably be an annual event. I don't feel like we have been as much successful concerning a Community of Practice among Inquire Partners. But on the other hand the collaboration between the different disciplines at our institution has had a dramatically [sic.] change."

8. Final INQUIRE Conference

The INQUIRE Conference took place at the Royal Botanic Gardens, Kew Gardens in the Jodrell Laboratory on 9th-10th July 2013. This conference was entitled: “Raising Standards Through Inquiry: Professional Development in the Natural Environment”. The conference represented a key project milestone - MS5 - which required the achievement of Task 6.5. ‘Organise Final Conference’. Overall responsibility fell to BGCI which was tasked to successfully meet the project requirements of attracting 150 attendees from the 11 participating countries including educators, teachers, researchers and education decision makers. In the event, the conference attracted 124 delegates from 14 countries with many delegates being drawn from beyond the PP and were new to the INQUIRE Project.

8.1 Conference Process

BGCI met these requirements by effectively and professionally organising and managing the conference process. This involved:

- identification of a suitable venue for 150 delegates;
- development of the conference programme;
- identification of keynote speakers to address the conference;
- production of a conference flyer to promote the conference and distribute via the INQUIRE website, e-newsletter and Partner networks;
- setting up a Final Conference area on the project website;
- correspondence with delegates;
- managing the registration process;
- organisation of the catering;
- liaison with hotels and delegates to support bookings;
- production of the conference programme.

The final Conference-related task, publication of the conference proceedings: D6.4: ‘Proceedings of the Final Conference’, has been completed.

As a delegate I can attest to the professionalism with which these activities were achieved to generate a smooth conference process, from registration through to attendance. Support was provided to locate suitable accommodation from a recommended list of hotels.

8.2 INQUIRE Principles enacted through the conference

The Conference provided an excellent platform for disseminating the key achievements of the INQUIRE Project. Indeed, a key rationale for the conference was “to showcase inquiry-based learning in Europe”. The conference was framed by three Keynote addresses from eminent academics in the field of science education:

- Professor Justin Dillon, Kings College London (a member of the INQUIRE Project and PMB).
Opening Keynote title: Outdoor Science – developing scientific literacy through inquiry;
- Professor Doris Jorde, Norwegian Centre for Science Communication, Oslo, Norway.
Keynote title: What is this thing called inquiry, and why is it so important for teaching and learning science?;
- Professor Angela McFarlane, Royal Botanic Gardens, Kew, UK.
Closing Address/Keynote title: Where will out curiosity lead us next?

In addition, the INQUIRE Project Principle Investigator, Professor Suzanne Kapelari, provided a whole conference contextualisation of the INQUIRE Project, its rationale, goals and achievements.

A notable characteristic was the delegation of responsibility among project Partners to deliver papers, presentations and interactive IBSE workshops based around work undertaken during the INQUIRE Project. In addition, there were opportunities to communicate project activities, findings and recommendations through Poster Sessions.

Together, the Keynote addresses, presentations, posters and workshops provided important set of experiences to enhance delegates' understanding of the pedagogical theory and practice of IBSE. In particular, workshop leaders provided opportunities for delegates to actively engage in 'hands-on' and 'minds-on' inquiry-style activities, developed to promote inquiry-oriented learning – often in an outdoor setting in the grounds of Kew Gardens.

A great diversity of engaging and creative topics were covered in the presentations, posters and workshops. Topics included: covering scientific content (including complex and controversial socio-scientific issues), inquiry process, logistics of managing IBSE sessions, and pedagogical matters related to particular educational phases (including training and professional development for educators), contexts (including 'online') or purposes (including assessment, collaborative work etc.). This diversity of quality input is evidenced by the comprehensive Conference Programme. As External Evaluator, I strove to visit as many sessions as possible. I was impressed by the consistently high standard of the sessions in which I participated.

Finally, the conference provided an excellent opportunity for networking through a variety of strategies: informal discussion during breakout sessions, 'poster sessions', during coffee breaks and meals, and specific activities such as 'speed dating' and 'World Café' sessions. The latter was oriented around two *Key Questions*:
Qu1: How could you promote INQUIRE courses to your target audiences at local and national levels?
Qu2: Apart from an INQUIRE training course, what other actions could you take to encourage the use of IBSE in schools and LotC at both local and national level to have a long lasting impact in the education system of your country?

A particularly welcome opportunity in this respect was the social picnic event, arranged to coincide with an evening concert taking place in the grounds of Kew. Such opportunities provided a good basis for the consolidation (among existing Partners) and expansion (to include non-project Partner delegates) of the INQUIRE CoP and associated friendships.

Overall, the conference was a quality event, which provided delegates with a valuable opportunity to develop in their understanding and practice of IBSE and to learn from the achievements of the INQUIRE Project. A particular response in Phase 2 Survey 1: Qu10 made a highly pertinent comment which nicely summarises the Conferences' value:
"It was a great idea to hold a final conference and publish the materials. I think it will demonstrate the actual outcomes of the project in the various countries and enable us to share our discoveries and ideas, while allowing the INQUIRE course teachers to meet colleagues from other countries. This could lead to future exchanges of experiences and development of INQUIRE techniques, and even contacts between students in different countries. For some of our teachers this is the first opportunity to take part in an international conference and it is very important for them. I would suggest holding regular INQUIRE conferences in the future."

9. Sustainability of INQUIRE

There is a great deal of evidence to suggest that the INQUIRE Project will now leave a very strong and long-lasting legacy. The final questions in Phase 2 Survey 4 were future-oriented and concerned with the issue of the future sustainability of the INQUIRE project. Question 7 asked: "To what extent do you anticipate that your ORGANISATION will be committed to promoting IBSE in the manner explored/developed during the INQUIRE Project BEYOND THE LIFE of the Project?" which elicited the following responses:

Table 21: "To what extent do you anticipate that your ORGANISATION will be committed to promoting IBSE in the manner explored/developed during the INQUIRE Project BEYOND THE LIFE of the Project?"

Responses	Response %	Response count
Extremely	30.8%	4
Very	61.5%	8
Moderately	7.7%	1
Slightly	0.0%	0
Not at all	0.0%	0
Answered question		13
Skipped question		0

These responses strongly suggest that the Partners are making, or have made, efforts to embed the learning and activities related to the INQUIRE project into their organisation's operation. The subsequent question sought to elicit qualitative answers by asking (Qu8): "Please describe any activities that your organisation is undertaking to continue the work you have engaged in during the INQUIRE Project (e.g. are you developing or have you developed any specific initiatives, programs or strategies for the future?)". This elicited the following comments:

"We'll try to continue the course next year but with another organisation. IBSE will be the main topic of the french [sic.] national botanic garden educators meeting in two years and we'll stay open to guide other gardens who wants to get involved and learn about IBSE."

"Next year there will be a new teacher course based on our experiences. The connections between different institutions will probably be maintained through annual seminars, either at our museum or at another institution. We have change our way of teaching in the Botanical garden from a teacher centered to IBSE way of thinking which off course will be our way of teaching in the future."

"As the University is expanding its work with schools, it is interested in continuing the INQUIRE course on a permanent basis and in introducing innovative educational techniques. We are therefore currently working not only to certify the pilot course, but to offer a certified INQUIRE course on a permanent basis. […]"

"We plan to propose the Course developed under the INQUIRE Project as a training for teachers who

would like to invest in their own development. At the same time, forthcoming are talks on the possibility such a course to be part of the curriculum of Biology students studying to be teachers. […]."
"INQUIRE has become part of the regular teacher Training Curriculum. The cooperation of the educators of the biogarden, the Institute of ecology and the Institute of biology education will be going on."
"We will offer the teacher training course in the same manner as we have developed it, every year for three full days. We will develop more INQUIRE modules with our staff, over the next years and we are going to try them out with our school classes and teachers who are willing to participate in our courses. […]."
"We have already run 3 INQUIRE courses and we are planning to run another before it ends (in October). We have also applied for funding to carry out free IBSE activities with local schools through the school year 2013-2014. We would really like to mantain the INQUIRE website and the social networks (Twitter, Facebook and Youtube) and to keep offering INQUIRE courses in the future. We have gained a lot of experience and we have developed many resources and it would be a pitty to stop using it. The Project has been very useful and enriching so we would really like to continue."

Additional sources of information on the future sustainability of the course, in terms of activities proposed or planned by Partners, is provided by the written documents, prepared by Partners, for the Trento meeting. These were accessed from the 'Sustainability of INQUIRE courses' sub-folder in Glasscubes. This contained eight documents prepared by particular Partner organisations. Some key points from these documents are presented below:

Organisation A

"After finishing the INQUIRE project the idea of IBSE will persist in the regular work of the botanika Green School in the Rhododendron-Park and Botanical Garden [location indicated]. By now, there are 7 modules which were developed during the project. There are also other new modules containing IBSE activities."
Instead of an extended series of day-long courses held over a term, this organisation is planning to adapt existing courses to run one-day training courses for teachers which will include theoretical input and practical examples with an opportunity for participants to plan IBSE activities. The plan is to collaborate with the the local University. The organisation is also considering setting up a 'Round Table' *"for all interested teachers, garden educators and others. Here they could come together and exchange their experiences, new ideas and plans for cooperation between the institutions. Especially the exchange of knowledge and experience is one of the major aspects for teachers to join advanced training courses."*

Organisation B

This organisation demonstrates the potential long-term and sustainability benefits of providing an accredited course for teachers, as well as integrating their work into Higher Education courses in partnership with the University. The organisation is also looking for creative funding opportunities to

ensure the course runs beyond the INQUIRE funding and is seeking to integrate the INQUIRE Project ethos into the University's teaching.

Organisation C

This organisation has a range of strategies for sustaining the INQUIRE activities, specifically:

1. Running the course again in 2013 – 2014 and for the foreseeable future.
2. Taking advantage of the relationships made with the 11 teachers trainers and two teacher trainees who participated in their course.
3. Strategic meetings with the pedagogical advisors of the three main educational networks (public schools, catholic schools and municipal schools)
4. Ensuring that the methods of IBSE infiltrate in the educational offer at [organisation's name].

Organisation D

This organisation plans to build on the two successful INQUIRE courses by running a similar course starting in September and ending in June 2014. The course will be targeted at upper-primary school teachers since such a targeted approach seems to work best. Attention will be placed on recruitment strategies to improve the recruitment and retention rate (a previous course had to be cancelled due to lack of take-up). As a consequence of the seeming lack of awareness of the museum among the teaching community, the organisation is planning to hold a 'get to know the museum' event. The organisation is also planning to continue its national networking activities.

Organisation E

This organisation will continue to build on the successes of the courses developed to date:

"When the project is over the School Biology Centre will continue to offer and run the three-day training course. There are already registrations for the 2013/14 INQUIRE course. The course should become a firm feature of the in-service training programme for teachers in schools and botanic gardens. … The course should be included in the official in-service teacher training catalogue for the Federal State of Lower Saxony, so that participating teachers can be released from their usual duties for the days and have their time credited as working hours."

The organisation will take advantage of existing course provisions and social networks to advertise the IBSE courses developed through the INQUIRE project.

Organisation F

This organisation will continue to deliver courses (on a fee paying basis) in-house. IBSE will provide a key focus for the refurbished glasshouse. It has also developed a high profile Partnership with RBG, Edinburgh to deliver IBSE courses in Scotland and is in discussion with other LOtC providers, such as the Wildlife and Wetlands Trust (WWT), to extend its reach and Partnership working.

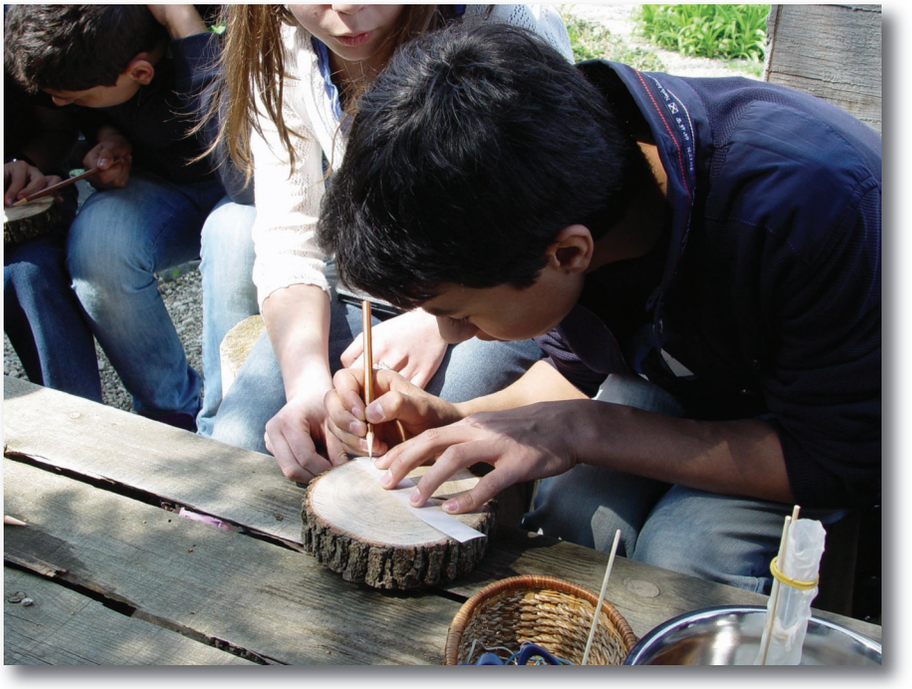
Organisation G

This organisation will build on the success of the pilot INQUIRE courses and roll them out on a regional and national level. They will continue to support participants through the provision of online course material.

Organisation H

This organisation has demonstrated the benefits of linking the activities of the INQUIRE project with post-graduate (Masters) study, with a number of students having completed their Masters dissertations on the INQUIRE courses delivered. The target for such in-service CPD and accredited postgraduate study will be extended beyond botanic gardens to science education and informal science education centres more broadly.

Together, these comments from written documents provided alongside Phase 2 Survey 4 responses provide a wealth of detail about the efforts being made by many Partners/organisations to sustain the activities developed as a consequence of their involvement in the INQUIRE Project. However, it is not possible to comment on those contexts from which a response or document was not forthcoming. That is to say, the sample of pro-sustainable comments presented here might be non-representative from a self-selecting group of committed Partners.



10. Conclusions

Project Management and Support

The project was exceedingly well managed and universally recognised as such across the Partnership. This has been consistently maintained throughout the project, with a consistency of positive experiences in evidence from responses in both phases of data collection. All project Deliverables and stated goals have been successfully achieved.

Level of support

Project Partners have been consistently pleased with the level of support provided by the Project Management Board and associated team, evaluating it, and valuing it, highly. This has contributed to the generally positive climate in evidence across the Partnership/COP. A specific Work Package was set up to support Partners (specifically WP7 in which KCL took on a support role).

Responsiveness

Partners evaluated the level of responsiveness to be high or excellent. Channels of support have been open at all times and responses provided in a rapid and friendly fashion.

Strengths/Weaknesses

When offered the opportunity to comment on either/or (both/and) strengths and weaknesses, the overwhelming majority of respondents talked of strengths. One or two comments did discuss perceived weaknesses, which related mostly to logistical issues such as the timing of tasks, delayed payments etc., but these were not representative and concerned matters beyond the control of the PMB.

Opportunities to collaborate

There was a greater spread of responses to questions posed around opportunities to collaborate. It seems that some Partners would have preferred still greater opportunity, but generally acknowledged that this problem lay beyond the remit of the project and its specific allocated budget. It was observed that there was a particularly long delay period between the last Partners' meeting and the final conference and some Partners wanted an opportunity to meet in some capacity (even virtually). Some Partners were able to take advantage of regional networks within the Partnership to create opportunities to collaborate within smaller sub-groups. This strategy was promoted and encouraged by the PMB. However, constraints meant that take-up was limited.

INQUIRE Manual

The Pilot Manual (D4.1) was recognised to be a quality document. However, a recommendation of the Preliminary Report was that this could be judiciously edited to make it more user-friendly. The Final INQUIRE Project Manual (D5.1) was, indeed, significantly restructured and reduced in volume. As such, it is likely to be more 'user friendly' while retaining its quality. It is a quality document deserving wide dissemination.

PMB Support Strategies

All Partners had one personalised support visit from KCL, paid for by the KCL budget. A second visit was offered at the Partner's own expense. The support visits were deemed to be very helpful, although the PMB identified a problematic uptake of the second support visit, since budgetary constraints meant that no Partner requested a visit. The PMB subsequently, and partly in response to comments in the Preliminary External Evaluator's report, devised a further support strategy in terms of 'Follow Up Calls'. Some participants valued them highly (Extremely or Very Helpful) and welcomed the opportunity to clarify specific issues that they had encountered. This was particularly valuable in order to keep on track during the hiatus between meetings. The process also allowed for a more targeted support dialogue (specific needs of the Partner at that specific time), which was more productive than responding to generic issues. It is also notable that the process of preparing for the call encouraged collaborative dialogue among participants at the same Partner institution.

Where the 'Follow-Up Calls' were evaluated less positively ('Moderately' or 'Neither Helpful nor Unhelpful') it seems that Partners were either: confidently on track (and therefore not requiring further clarification about any issues); the calls took the form of 'check-up calls' with few substantive issues addressed; or there were language barriers to communication. One neutral response was a consequence of the simple fact that the Partner had not actually taken part in a Follow-Up Call (and therefore not in a position to make a judgement).

Project Co-ordination, Administrative Support and Participants' experience

Coordination provided by the Management Board and administrative support, undertaken principally by BCGI, was considered to be excellent across both phases and very well appreciated by Partners. Participants expressed a clear and unambiguous liking for being involved in the project throughout its duration.

Communication across the Partnership

A significant challenge presented to the Management Board and PI was the international nature of the project, which gave rise to a wide range of divergent characteristics across the Partnership, notably in educational systems and curricular and language proficiencies. Overall, however, the project managed any associated tensions well.

Communication across the Partnership has been generally, if not consistently, good. The Glasscubes system proved to be generally good at promoting communication across the Partnership and provided a channel for sharing information and materials. However, it did prove rather unpopular in terms of its 'user friendliness' among a small number of Partners. Other Partners recognised the value of the social networking systems for facilitating communication across the Partnership and in providing a 'one-stop-shop' repository for documents, etc. A particularly valued dimension of the INQUIRE Partnership was the face-to-face Project Meetings.

Workload and Structure

Tasks and deadlines proved to be generally achievable within the timescales set. Participants were usually aware of them well in advance and were able to plan suitably in order to achieve them. Occasionally, however, new tasks were set with very short timescales to achieve them. Furthermore, participants sometimes found it difficult to discern the type of task (level of priority and/or amount of work involved). Some Partners suggested that some more thought might have been given to the design of deliverables to provide less work and more time for Partners to prepare for them. This resulted in a recommendation in the Interim External Evaluator report that tasks should be designated at least two weeks in advance. Efforts were made by the PMB to address this recommendation. Wherever possible, adequate notice was provided in the run up to tasks.

Academic Input

Partners appreciated the input of Academic members of the Partnership. Supporting materials were generally received positively, although there were some reservations (e.g. 'ideas for investigations').

Partner effectiveness

Partners' participation in Project: Generally, Partners felt that they had managed to participate in, and contribute to, the project, although most responses fell within the 'very' or 'moderately' regularly categories, with fewer being able to say 'extremely regularly'. Equally, Partners felt that they had managed to complete required tasks by the designated deadline. This relates to a recurring theme, namely the constraints on Partners' time due to existing workloads.

All Partners felt that they had developed courses which met the objectives of the INQUIRE Project. Furthermore, most Partners demonstrated a high degree of critical reflection in terms of their evaluation of their work.

Challenges presented to, and overcome by, Partners: Partners had to contend with a range of challenges. Perhaps the most significant were challenges associated with time and cost constraints, given that participation in the project was over and above existing work commitments. Other challenges included attempting to assimilate the wealth of new theoretical and practical material. This was particularly the case for Partners relatively unfamiliar with IBSE, prior to joining the Partnership. A similar challenge was presented to all Partners who were required to develop an understanding and expertise in the specific operation of the INQUIRE Project (including new tools such as Glasscubes).

Other challenges facing participants involved the overt training rationale of the project, which did not represent a major focus of their roles prior to the project, and catering for a diversity of trainees' needs, many of whom were unfamiliar with IBSE and the constructivist/student-centred rationale upon which it is based. Another challenge was associated with the need to cascade understandings of IBSE to Partners' colleagues. Additionally, the expectations of some participating teachers did not, initially at least, match the requirement to 'actively' develop their own materials. Indeed, even the necessary

recruitment and retention of trainees/course participants was challenging, whether they were botanical garden colleagues or teachers.

A final challenge was to find support within the Partners' organisations. This seemed to be problematic in employment regimes in the botanic gardens sector, where teams might be very small and colleagues have multiple roles and responsibilities. Recruiting or identifying colleagues with whom to nurture a collaborative working relationship and then to retain them is, with limited funding, very difficult.

That the vast majority of participants managed to overcome these challenges, is testament to the general level of motivation and enthusiasm across the Partnership/CoP, as well as the carefully structured nature of the overall project and the support mechanisms and strategies put in place by the PMB.

Project Impacts

Participants' understandings, and practice, of IBSE: The Partnership was set up and developed in such a way that the expertise and confidence of all Partners was significantly enhanced in terms of IBSE, with a focus on 'student-centred' models of teaching and learning. The activities and process within the INQUIRE Project contributed significantly to the development of a shared understanding of IBSE, albeit one which still allowed for a range of interpretations. There is evidence of a positive shift in personal understandings of, and commitment to, IBSE which is a direct consequence of the Partners' involvement in the INQUIRE Project. Most Partners are now able to provide a sophisticated definition of IBSE. The greatest benefit of their involvement in the INQUIRE Project was the opportunity for critical reflection on the purposes of science learning and the provision of a framework (or set of frameworks) – and a language – through which to conceptualise more student-centred and active approaches to learning science.

Impact on Individual's Organisation's commitment to IBSE: The evidence suggests that, through participation in the INQUIRE Project, institutional or organisational understanding of, and commitment to, IBSE was enhanced. However, the instituational benefits were not as pronounced as they they were for those individual participants who directly engaged with the project.

Multiple CoP Development: A major focus of the INQUIRE project was to nurture CoP. These were discerned at various levels:

- Across the INQUIRE Partnership: The evidence suggests that a very strong, engaged and committed CoP emerged among the INQUIRE Partnership. Without exception, Partners indicated that they benefited greatly, at both at individual and organisational levels, in their own learning about IBSE and ESD, through dialogue with other members of the CoP. They hoped to continue collaborating.
- Institutional/Organisation level: At the institutional/organisational level, participation was recognised as significant in terms of creating an 'appetite' within the organisation for IBSE.
- Extra-Partnership (Local/Regional) COPs: A particularly powerful 'added value' of participation

identified by some Partners was the strengthening, or even development of new, 'local' or 'regional' CoPs.

Final INQUIRE Conference

The INQUIRE Conference took place in the Jodrell Laboratory at the Royal Botanic Gardens, Kew, on 9th-10th July 2013. It was entitled: "Raising Standards Through Inquiry: Professional Development in the Natural Environment". The conference represented a key project milestone, MS5, which required the achievement of Task 6.5. 'Organise Final Conference'. It was extremely well planned and executed and provided an excellent platform for disseminating the key achievements of the INQUIRE Project as well as showcasing inquiry-based learning in Europe.

Together, the Keynote addresses, presentations, posters and workshops provided an important set of experiences to enhance delegates' understanding of the pedagogical theory and practice of IBSE. A great diversity of engaging and creative topics were covered in the presentations, posters and workshops. They addressed: scientific content (including complex and controversial socio-scientific issues), inquiry process, logistics of managing IBSE sessions, pedagogical matters related to particular educational phases (including training and professional development for educators), contexts (including 'online') or purposes (including assessment, collaborative work etc.). This diversity of quality input was manifest in the comprehensive Conference Programme.

Finally, the conference provided an excellent opportunity for networking in a variety of contexts: informal discussions during breakout sessions, 'poster sessions', coffee breaks and meals, as well as specific activities such as 'speed dating' and 'World Café' sessions.

Overall, the conference was a quality event which provided delegates with a valuable opportunity to develop in their understanding and practice of IBSE and to learn from the achievements of the IN-QUIRE Project.

Sustainability of INQUIRE

Partners are making, or have made, significant efforts to embed the learning and activities related to the INQUIRE project into their organisation's operation. However, it is not possible to comment on those Partners from whom responses or documents were not forthcoming. The sample of pro-sustainable comments presented here may be unrepresentative, since they came from a self-selecting group of committed Partners.

Overall conclusion

The INQUIRE Project followed an impressive trajectory through its lifespan, culminating in a project that fulfilled (and arguably exceeded) its stated objectives, as set out in Table 1. It has left a powerful legacy in terms of the enhancement of IBSE (and ESD) in the Partners' regional and national contexts and also has the potential to enhance IBSE (and ESD) across the European Union and beyond.

Beneficiaries of the INQUIRE project include:

- the Partners themselves, who developed a strong and committed CoP that is likley to be sustained beyond the life of the project;
- Teachers involved directly in the training;
- The wider botanic garden education community who benefit from the 'Train the Trainers' activities and material;
- The science education and related (e.g. ESD) communities;
- The education community at large.

The project has left a robust legacy that greatly benefits each of these constituencies. However, in order for this legacy to reach its full potential, it is desirable that additional structural support be forthcoming from the wider science education community at the levels of practice, research and, most importantly, policy.

Recommendations

For the INQUIRE CoP in post-INQUIRE Project phases: Attempts to provide mechanisms or strategies – geographical, language or thematic – were devised, post-interim report, to encourage additional or more focused collaboration across sub-groups of the Partnership. However, these were not fully utilised or engaged with by CoP Partners. This was largely a consequence of resourcing. In future, it would be desirable that such mechanisms and strategies were operationalised more fully. This will probably require a degree of further collaboration and negotiation across the CoP to ensure successful uptake. It will also, most likely, require the identification of further resourcing from external sources.

For Policy Makers: Opportunities to facilitate continuing activities of the INQUIRE CoP at the institutional, regional, national and international levels should be developed.

The wealth of material produced by the project should be as widely disseminated as possible. Particular strengths include the central material such as the 'D.5.1. Final INQUIRE Course Manual' and exemplary materials produced by the Partners.

References

Committee on Learning Science in Informal Environments (2009) *Learning Science in Informal Environments: People, Places, and Pursuits,* Washington, DC, The National Academies Press.

Dillon, Justin, Morris, Marian , O'Donnell, Lisa , Reid, Alan , Rickinson, Mark & Scott, William (2005) *Engaging and Learning with the Outdoors – The Final Report of the Outdoor Classroom in a Rural Context Action Research Project.* Slough, National Foundation for Educational Research.

Fenichel, Marilyn & Schweingruber, Heidi A. (2010) *Surrounded By Science: Learning Science in Informal Environments,* Washington, DC, The National Academies Press.

Gilbert, John K. (2010) *Supporting the development of effective science teachers***.** In Osborne, Jonathan & Dillon, Justin (Eds.) Good Practice in Science Teaching: What the research has to say. 2 ed. Maidenhead, McGraw Hill.

High Level Group on Science Education (2007) *Science Now: A Renewed Pedagogy for the Future of Europe.* Brussels, European Union.

INQUIRE Consortium (2010) 266616- INQUIRE: Annex I - "Description of Work". (2011) *Pilot INQUIRE Course Manual for teachers and educators*.

King, Heather & Glackin, Melissa (2010) *Supporting Learning in out-of-school contexts.* In Osborne, Jonathan & Dillon, Justin (Eds.) Good Practice in Science Teaching: What the research has to say. 2 ed. Maidenhead, McGraw Hill.

Millar, Robin & Osborne, Jonathan (1998) *Beyond 2000: Science education for the future.* London, King's College London.

Morgan, Alun (2012) 'INQUIRE: Inquiry based teacher training for a sustainable future' Project (EU FP7 SiS-2010-2.2.1.1): *External Evaluation - Interim Report*. Exeter, INQUIRE Project.

OECD (2006) *Evolution of Student Interest in Science and Technology Studies Policy Report.* Paris, OECD.

Osborne, Jonathan & Dillon, Justin (2008) *Science Education in Europe: Critical Reflections.* London, Nuffield Foundation.

Patton, Michael Quinn (2000) *Utilization-Focused Evaluation.* In Stufflebeam, D.L. , Madaus, George F. & Kellaghan, T. (Eds.) Evaluation Models: Viewpoints on Educational and Human Services Evaluation. 2 ed. Boston, MA, Kluwer Academic Publishers.

Rickinson, Mark , Dillon, Justin , Teamey, Kelly , Marian Morris, Choi, Mee Young , Sanders, Dawn & Benefield, Pauline (2004) *A Review of Research on Outdoor Learning.* London, National Foundation for Educational Research and King's College London.

Simon, Shirley & Osborne, Jonathan (2010) *Students' Attitudes to Science*. In Osborne, Jonathan & Dillon, Justin (Eds.) Good Practice in Science Teaching: What the research has to say. 2 ed. Maidenhead, McGraw Hill.

Appendices

Appendix 1. Survey Monkey® questionnaire

PHASE 1 Preliminary SURVEY 1: INTERNAL EFFECTIVENESS/SUPPORT

1. Are you satisfied with level of support provided by the Management Board?

Extremely satisfied
Moderately satisfied
Slightly satisfied
Neither satisfied nor dissatisfied
Slightly dissatisfied
Moderately dissatisfied
Extremely dissatisfied

2. Can you identify a particular strength of the INQUIRE Project Management Board? (please provide a comment)

3. Can you identify a weakness or area for improvement of the INQUIRE Project Management Board? (Please provide a comment)

4. How responsive is the INQUIRE Management Board?

Extremely responsive
Very responsive
Moderately responsive
Neutral – neither particularly responsive nor unresponsive
Slightly unresponsive
Very unresponsive
Extremely unresponsive

5. Overall, are you satisfied with your experience of being a partner in the INQUIRE Project?

Extremely satisfied
Moderately satisfied
Slightly satisfied
Neither satisfied nor dissatisfied
Slightly dissatisfied
Moderately dissatisfied
Extremely dissatisfied

6. How helpful have you found the resources provided to you such as 'ideas for investigations'?

Extremely helpful
Very helpful
Moderately helpful
Neither helpful nor unhelpful
Moderately unhelpful
Very unhelpful
Extremely unhelpful

7. Overall, are you satisfied with INQUIRE Project Partner meetings?

Extremely satisfied
Moderately satisfied
Slightly satisfied
Neither satisfied nor dissatisfied
Slightly dissatisfied
Moderately dissatisfied
Extremely dissatisfied

8. Have you found the support visits by the management board useful?

Extremely helpful
Very helpful
Moderately helpful
Neither helpful nor unhelpful
Moderately unhelpful
Very unhelpful
Extremely unhelpful

9. Are you satisfied with the number and quality of opportunities to collaborate with partners in the INQUIRE Project?

Extremely satisfied
Very satisfied
Moderately satisfied
Neither satisfied nor unsatisfied
Moderately dissatisfied
Very dissatisfied
Extremely dissatisfied

10. Which are your preferred channels for communication (specifically within the INQUIRE Project) - please rank the following methods in order of preference (1st being most favoured, 5th being least favoured)

	1st	2nd	3rd	4th	5th
Glasscubes					
Skype					
Email					
Telephone					
Face to face at meetings					

PHASE 1 Preliminary SURVEY 2: Partner/Project Effectiveness

1. Do you feel you have a good understanding of the rationale of the INQUIRE Project?

- Extremely good understanding
- Very good understanding
- Moderately good understanding
- Neither a good nor a poor understanding
- Moderately poor understanding
- Very poor understanding
- Extremely poor understanding

2. In your own words, can you briefly summarise what you believe to be the overarching rationale of the INQUIRE Project (max 300 words)

3. In your own words, can you write a brief summary of your understanding of 'Inquiry-Based Science Education' (IBSE) (max 300 words)

4. In your own words, can you say how your involvement with the INQUIRE Project has altered your understanding of Inquiry-Based Science Education (IBSE) (max 300 words)

5. To what extent to you think you have been able to regularly engage in an active and collaborative manner with the activities of the INQUIRE Project?

- Extremely regularly
- Very regularly
- Moderately regularly
- Not very regularly
- Neither regularly nor irregularly
- Very irregularly
- Extremely irregularly

6. Can you briefly describe the principle difficulties you have faced in terms of your active engagement with the project (and the extent to which you have been able to overcome them) (max 300 words)

7. Have you been able to meet deadlines for delivering materials requested by the Management Board (e.g. formal 'Deliverables')

Always
Nearly always
Mostly
Sometimes
Never

8. How effective do you feel the course you have designed for your particular site/context for addressing the overarching aims of the INQUIRE Project?

Extremely effective
Very effective
Mostly effective
Neither effective nor ineffective
Mostly ineffective
Very ineffective
Extremely ineffective

9. On reflection, what would/will you change in terms of your site-specific course in order to strengthen its effectiveness? (max 300 words)

10. Given your experiences in the INQUIRE Project, would you be willing to engage with a similar initiative in the future?

Extremely willing
Mostly willing
Moderately willing
Neutral (neither particularly willing nor unwilling)
Moderately unwilling
Mostly unwilling
Extremely unwilling

PHASE 1 Preliminary SURVEY 3: IMPACT

1. Please state your name and institutional affiliation

2. To what extent has your PERSONAL involvement in the INQUIRE Project enhanced or improved your personal understanding of Inquiry-Based Science Education

Extremely
Very
Moderately
Slightly
Not at all

3. To what extent has your PERSONAL involvement in the INQUIRE Project increased your personal commitment to promoting Inquiry-Based Science Education in your work?

Extremely
Very
Moderately
Slightly
Not at all

4. Please provide a brief explanatory comment on your answers to questions 2 and 3

5. To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective understanding of your organisation/staff of Inquiry-Based Science Education

Extremely
Very
Moderately
Slightly
Not at all

6. To what extent has your ORGANISATION's involvement in the INQUIRE Project increased your organisational/collective commitment to promoting Inquiry-Based Science Education in the work of your organisation?

Extremely
Very
Moderately
Slightly
Not at all

7. Please provide a brief explanatory comment on your answers to questions 5 and 6 (from your personal perspective)

8. To what extent do you envisage that your ORGANISATION's involvement in the INQUIRE Project may have enhanced or improved the understanding of Inquiry-Based Science Education among the professional community (e.g. teachers) with whom you work?

Extremely likely
Very likely
Moderately likely
Neither likely nor unlikely
Moderately unlikely
Very unlikely

9. To what extent do you envisage that your ORGANISATION's involvement in the INQUIRE Project may have enhanced or improved the commitment to promoting Inquiry-Based Science Education among the professional community (e.g. teachers) with whom you work?

Extremely likely
Very likely
Moderately likely
Neither likely nor unlikely
Moderately unlikely
Very unlikely
Extremely unlikely

10. Please provide a brief explanatory comment on your answers to questions 8 and 9 (from your personal perspective) - please indicate any anecdotal evidence if you are able

PHASE 2 Final SURVEY 1: Internal Effectiveness

1. Please indicate your name and organisational affiliation

2. Are you satisfied with level of support provided by the Management Board?

Extremely satisfied
Moderately satisfied
Slightly satisfied
Neither satisfied nor dissatisfied
Slightly dissatisfied
Moderately dissatisfied
Extremely dissatisfied

3. How responsive is the INQUIRE Management Board?

Extremely responsive
Very responsive
Moderately responsive
Neutral - neither particularly responsive nor unresponsive
Slightly unresponsive
Very unresponsive
Extremely unresponsive

4. Overall, are you satisfied with your experience of being a Partner in the INQUIRE Project?

Extremely satisfied
Moderately satisfied
Slightly satisfied
Neither satisfied nor dissatisfied
Slightly dissatisfied
Moderately dissatisfied
Extremely dissatisfied

5. Overall, are you satisfied with INQUIRE Project Partner meetings?

Extremely satisfied
Moderately satisfied
Slightly satisfied
Neither satisfied nor dissatisfied
Slightly dissatisfied
Moderately dissatisfied
Extremely dissatisfied

6. Have you found the FOLLOW-UP PHONE CALLS by the Management Board useful?

Extremely helpful
Very helpful
Moderately helpful
Neither helpful nor unhelpful
Moderately unhelpful
Very unhelpful
Extremely unhelpful

7. Can you identify a particular STRENGTH of the INQUIRE Project Management Board? (please provide a comment)

8. Can you identify a weakness or area for improvement of the INQUIRE Project Management Board? (Please provide a comment)

9. Are you satisfied with the number and quality of opportunities to collaborate with Partners in the INQUIRE Project?

Extremely satisfied
Very satisfied
Moderately satisfied
Neither satisfied nor unsatisfied
Moderately dissatisfied
Very dissatisfied
Extremely dissatisfied

10. Please provide a comment to support your answer to Question 9. Perhaps you would like to comment on, for example, strengths and/or limitations associated with:

- different types of opportunities – whole project or small group face-to-face meetings and/or virtual meetings
- document sharing and/or collaborative development
- the different communication channels utilised during the project – meetings, Glasscubes, etc
- issues related to language
- time constraints
- or any other issues

PHASE 2 Final SURVEY 2: Partner/Project Effectiveness

1. Please indicate your name and organisational affiliation

2. In your own words, can you briefly summarise what you believe to be the overarching rationale of the INQUIRE Project (max 300 words)

3. In your own words, can you write a brief summary of your understanding of 'Inquiry-Based Science Education' (IBSE) (max 300 words)

4. In your own words, can you say how your involvement with the INQUIRE Project has altered your understanding of Inquiry-Based Science Education (IBSE) (max 300 words)

5. To what extent to you think you have been able to regularly engage in an active and collaborative manner with the activities of the INQUIRE Project?

Extremely regularly
Very regularly
Moderately regularly
Not very regularly

Neither regularly nor irregularly
Very irregularly
Extremely irregularly

6. Can you briefly describe the principle difficulties you have faced in terms of your active engagement with the project (and the extent to which you have been able to overcome them) (max 300 words)

7. Have you been able to meet deadlines for delivering materials requested by the Management Board (e.g. formal 'Deliverables')

Always
Nearly always
Mostly
Sometimes
Never

8. How effective do you feel the course you have designed for your particular site/context for addressing the overarching aims of the INQUIRE Project?

Extremely effective
Very effective
Mostly effective
Neither effective nor ineffective
Mostly ineffective
Very ineffective
Extremely ineffective

9. On reflection, what would/will you change in terms of your site-specific course in order to strengthen its effectiveness? (max 300 words)

10. Given your experiences in the INQUIRE Project, would you be willing to engage with a similar initiative in the future?

Extremely willing
Mostly willing
Moderately willing
Neutral (neither particularly willing nor unwilling)
Moderately unwilling
Mostly unwilling
Extremely unwilling

PHASE 2 Final SURVEY 3: IMPACT

1. Please state your name and institutional affiliation

2. To what extent has your PERSONAL involvement in the INQUIRE Project enhanced or improved your personal understanding of Inquiry-Based Science Education

Extremely
Very
Moderately
Slightly
Not at all

3. To what extent has your PERSONAL involvement in the INQUIRE Project increased your personal commitment to promoting Inquiry-Based Science Education in your work?

Extremely
Very
Moderately
Slightly
Not at all

4. Please provide a brief explanatory comment on your answers to questions 2 and 3

5. To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective understanding of your organisation/staff of Inquiry-Based Science Education

Extremely
Very
Moderately
Slightly
Not at all

6. To what extent has your ORGANISATION's involvement in the INQUIRE Project increased your organisational/collective commitment to promoting Inquiry-Based Science Education in the work of your organisation?

Extremely
Very
Moderately
Slightly
Not at all

7. Please provide a brief explanatory comment on your answers to questions 5 and 6 (from your personal perspective)

8. To what extent do you envisage that your ORGANISATION's involvement in the INQUIRE Project may have enhanced or improved the understanding of Inquiry-Based Science Education among the professional community (e.g. teachers) with whom you work?

Extremely likely
Very likely
Moderately likely
Neither likely nor unlikely
Moderately unlikely
Very unlikely

9. To what extent do you envisage that your ORGANISATION's involvement in the INQUIRE Project may have enhanced or improved the commitment to promoting Inquiry-Based Science Education among the professional community (e.g. teachers) with whom you work?

Extremely likely
Very likely
Moderately likely
Neither likely nor unlikely
Moderately unlikely
Very unlikely
Extremely unlikely

10. Please provide a brief explanatory comment on your answers to questions 8 and 9 (from your personal perspective) - please indicate any anecdotal evidence if you are able

PHASE 2 Final SURVEY 4: Community of Practice & Sustainability

1. Please state your name and institutional affiliation

2. To what extent do you feel that your PERSONAL involvement in the INQUIRE Project has allowed you to feel part of an emerging COMMUNITY OF PRACTICE in terms of IBSE?

Extremely
Very
Moderately
Slightly
Not at all

3. To what extent do you feel that your PERSONAL involvement in the INQUIRE Project and the emerging COMMUNITY OF PRACTICE has enhanced your EFFICACY (or effectiveness) as a practitioner of IBSE

Extremely
Very
Moderately
Slightly
Not at all

4. Please provide a brief explanatory comment on your answers to questions 2 and 3

5. To what extent do you feel that your ORGANISATION'S involvement in the INQUIRE Project has actively contributed to the development of a COMMUNITY OF PRACTICE across and beyond the project partners?

Extremely
Very
Moderately
Slightly
Not at all

6. Please provide a comment to explain your answer above - perhaps you are able to describe specific strategies that your organisation has employed to support the development of a COMMUNITY OF PRACTICE among INQUIRE Partners and/or among the collaborative participants (teachers etc.) in your region

7. [This question is about the long term sustainability of the impact of the project] To what extent do you anticipate that your ORGANISATION will be committed to promoting IBSE in the manner explored/developed during the INQUIRE Project BEYOND THE LIFE of the Project?

Extremely
Very
Moderately
Slightly
Not at all

8. Please describe any activities that your organisation is undertaking to continue the work you have engaged in during the INQUIRE Project (e.g. are you developing or have you developed any specific initiatives, programs or strategies for the future?)

9. To what extent do you envisage that your ORGANISATION's involvement in the INQUIRE Project will have resulted in a long term improvement in terms of the commitment to promoting Inquiry-Based Science Education among the professional COMMUNITY OF PRACTICE (e.g. teachers) with whom you work?

Extremely likely
Very likely
Moderately likely
Neither likely nor unlikely
Moderately unlikely
Very unlikely
Extremely unlikely

10. Please provide a brief explanatory comment on your answers to Question 9 - please indicate any anecdotal evidence if you are able

Appendix 2: Interview semi-structured interview schedule for Skype interview

INQUIRE Skype Interviews

Introduction

The purpose is to gather some background of your experiences of involvement in the INQUIRE project You were chosen in order to have a good spread of organisations – internationally, size etc. – in the interview sample

Background

- Please tell me about your organisation:
  - What kind of organisation?
  - What work are you typically engaged with?
  - How many people work at your organisation?
  - How many are involved in the Inquire project?
- Before joining the INQUIRE project, how much:
  - Did you use Inquiry-Based Science Education?
  - Were you involved in teacher training?
- How did you get involved in the Inquire project?

Support

- What kind of support have your received from the Management Board and administrative support (based largely at Botanic Gardens Conservation International)?
  - How would you describe this level of support – good/bad?
  - Have there been any issues that have arisen?
  - Can you describe a particular strength?
  - Can you describe a particular weakness?
- If you were able to make a recommendation about how to improve the level of support, what would it be?
- Have you felt satisfied with the:
  - Materials provided to support the project?
  - Project meetings (how many have your organisation taken part in?)
- To what extent have you been supported by the Academic Partners – King's College, London & University of Bremen?

Effectiveness

- To what extent do you think you understood the rationale of the Inquire project when invited to join? How has this understanding changed or developed during the project?
- Can you say how your involvement with the INQUIRE Project has altered your understanding of

Inquiry-Based Science Education (IBSE)?

- Have you/your organisation been able to contribute fully as a partner in the INQUIRE project – can you say how?
- What barriers to collaboration have you experienced?
- Have you felt able to meet deadlines? Have the deadlines been realistic? Has the support been adequate to allow you to complete tasks?
- How effective do you feel the course you have designed for your particular site/context for addressing the overarching aims of the INQUIRE Project?
- To what extent have you used existing material for this course OR new?
- What might you change ?

Impact

- To what extent would you say that there is now a shared understanding of IBSE across the Partnership?
- To what extent has your PERSONAL involvement in the INQUIRE Project enhanced or improved your:
  - Understanding of Inquiry-Based Science Education?
  - Personal commitment to promoting Inquiry-Based Science Education in your work?
- To what extent has your ORGANISATION'S involvement in the INQUIRE Project enhanced or improved the collective:
  - Understanding of your organisation/staff of Inquiry-Based Science Education?
  - Organisational/collective commitment to promoting Inquiry-Based Science Education in the work of your organisation?
- To what extent do you envisage that your ORGANISATION's involvement in the INQUIRE Project may have enhanced or improved:
  - The understanding of Inquiry-Based Science Education among the professional community (e.g. teachers) with whom you work?
  - May have enhanced or improved the commitment to promoting Inquiry-Based Science Education among the professional community (e.g. teachers) with whom you work?

INQUIRE

External Evaluation Report

Supported by