



Professional Learning of Partner Organisations while Participating in the European FP7 Inquire Project

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Abstract

Recent innovations in science education - in and out of school - have focused on inquiry-based science teaching (IBST), which, done well, has been shown to support students' interest in science as well as the development of critical thinking skills. Funded by the European Union under the 7th Framework Programme Science and Society INQUIRE: Inquiry-based teacher training for a sustainable future was a collaborative 3-year project aiming for implementing IBST while connecting the formal and informal education systems and science education research communities. The INQUIRE professional development design combines Vygotsky's constructivist approach of 'socio-cultural learning' and Lave and Wenger's ideas of 'situated learning in communities of practice and gives a practice based example that this approach has a great potential to support organisational as well as individual development. INQUIRE provides a practice based example that this approach has a great potential to support organisational as well as individual learning. Thus we suggest that evaluating project outcomes based on evidence related to community learning is an alternative and even more meaningful way for European projects to provide evidence for their success in the long run.

Introduction

Recent innovations in science education - in and out of school - have focused on inquiry-based science teaching (IBST), which, done well, has been shown to support students' interest in science as well as the development of critical thinking skills. There is mounting evidence that Learning Outside the Classroom (LOtC) can stimulate students' motivation in learning more about the world around us as well as supporting learners to develop a wide range of skills. However, the evidence suggests that significant professional development is required for IBST, particularly in the enactment of inquiry in classrooms, due to the complex and sophisticated nature of the approach [1].

INQUIRE: Inquiry-based teacher training for a sustainable future was a collaborative 3-year project connecting formal and informal education systems and science education research communities utilising recommendations on best practice in professional development [2], [3]. Funded by the European Union under the 7th Framework Programme Science and Society, it combined IBSE, LOtC and teacher training focusing on the themes of biodiversity and climate change. Through the sharing of expertise, 14 Botanic Gardens were supported in a continued and sustained way in developing their understanding of IBSE, reflective practice, evaluation and in the development of teacher training courses. The INQUIRE professional development design combines Vygotsky's constructivist approach of 'socio-cultural learning' and Lave and Wenger's ideas of 'situated learning in communities of practice and gives a practice based example that this approach has a great potential to support organisational as well as individual development. We assume that European projects become most effective if a strong learning community can be established among project partners. Hence the INQUIRE project management endeavour to support partners to establish an active learning community in course of this three year project. Thus we suggest that evaluating project outcomes based on evidence related to community learning is an alternative and even more meaningful way for European projects to provide evidence for their success in the long run.

Professional Learning Communities

A main characteristic of Communities of Practice is that participants hold a common interest in the subject and collaborate over an extended period of time to share ideas, find solutions and build innovation. Shulman and Shulman (2004)[4] noted that there is an ongoing interaction between an



individual professionals and the community. This leads to a shared knowledge of the team which finally offers members the opportunity to confirm, interconnect and develop their professional knowledge. Communities of Practice have proven already to be successful in supporting participant's knowledge development [5].

Professional Learning Communities, as termed in INQUIRE offer the space for learners to discuss and exchange knowledge as well as to make use of the social capital individual members provide [6]. Wenger [5] pointed out that social learning occurs as soon as people who have a common interest in some subject or problem collaborate over an extended period of time to share ideas, find solutions and build innovation. The INQUIRE learning community asked consortium partners to become reflective practitioner and to improve their own learning and teaching skills, to share responsibility for their individual and organizational learning and to partake in professionally guided discourse about one's teaching and learning. The discourse and the different views of practitioners and education researchers served to enhance the process of reflection about partners individual classroom and botanic garden teaching experiences and to expand their horizons, understandings and capabilities.

Methodology

The analytical approach is based on a qualitative evaluation strategy carried out by King's College London and draws on frameworks such as Miles and Huberman (1995)[7]; Guskey, 2000 [8]; Hatton and Smith (1995)[9]. Through a qualitative analysis of project deliverables, course materials, portfolios of evidence and semi-structured we report on how consortium partners develop their understanding of IBSE, particularly when put into practice at botanic gardens.

A single case analysis is added to provide insight into the organisational development of one individual partner embedded in a given socio-cultural contexts. This enables us to draw a more vivid and lively picture how INQUIRE partners experience their learning journey over a period of three years.

Results and Outcomes

The in depth evaluation of the INQUIRE project provides evidence that the project was successful in fostering an active learning community that partners attribute high value to. Partners felt that their involvement in the INQUIRE project provided opportunities for reflection on the nature of inquiry-based learning, the value of learning outside the classroom, and the teaching of issues related to biodiversity and climate change that would not have occurred ordinarily. Ultimately, most partners valued the experience in terms of their personal professional development and the resulting improvements and changes that abounded within their institutions.

The staffs of the Botanic Gardens have gained a lot of experience and we will try to continue running these courses in the future because we have raised and improved our contact and understanding with teachers. It has been also positive not only to the education team but to the rest of the staff who have been involved in the development of the courses, meetings, dissemination plan, conferences, etc.(SCp3)

The INQUIRE course has contributed to the development of science teaching, evidenced in the range and quality of the course material prepared, resulting in predominantly positive feedback from course participants with strong indications of changing practice noted across Europe.

This has largely been a result of the use of practical activities within the gardens that allowed teachers and educators to trial IBST in LOtC settings and in their own classrooms. These strategies on the course were most successful in increasing IBSE knowledge and skills because they could be used immediately or act as sources of inspiration for adaptation.

The status and role of botanic gardens was broadened in the eyes of the teachers, viewed now as 'privileged spaces for learning' as a result of the INQUIRE project. The significance of botanic gardens as learning spaces, centres of scientific excellence and teacher-training, locations for learning outside of the classroom and IBST activities was recognised by the course participants. Enjoyment of the garden as a learning space was also noted, resulting in increased school bookings and visits to the gardens by teachers with their classes. In many cases this was generated from more positive attitudes and from the practical activities that developed the knowledge and skills required to conduct IBST in botanic gardens.

The INQUIRE project has had numerous significant influences on both the formal and informal sector. In developing the courses partners have developed positive relationships which bridge the formal and



informal divide. Many partners report positively about their relationships and extending networks with teachers, schools, education departments and other stakeholders in both the formal and informal sector. As a result, the use of botanic gardens as a LOtC institution to promote students' engagement with science has been highlighted in both formal and informal settings.

Conclusion

The INQUIRE project design combines Vygotsky's constructivist approach of 'socio-cultural learning' and Lave and Wenger's ideas of 'situated learning in communities of practice' and gives a practice based example that this approach has a great potential to support organisational as well as individual learning.

References:

- [1] Capps, D.K., Crawford, B.A. & Constan, M.A. (2012). A Review of Empirical Literature on Inquiry Professional Development: Alignment with Best Practices and a Critique of the Findings, *Journal of Science Teacher Education*, 12, pp291-318
- [2] Darling-Hammond, L., & McLaughlin, M.W. (1995). Policies that support professional development in an era of reform, *Phi Delta Kappan*, 76(8), pp597-604
- [3] Loucks-Horsley, S., Hewson, P.W., Love, N. & Stiles, K.E. (1998). *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks, CA: Corwin Press.
- [4] Shulman, L.S & Shulman, J.H. (2004). How and what teachers learn: a shifting perspective. *Journal of Curriculum Studies* 36(2), pp257-271
- [5] Lave, J. & Wenger, E. (1991). *Situated Learning. Legitimate Peripheral Participation*. Cambridge University Press, Edinburg, UK
- [6] Hofman, R. H., & Dijkstra, B. J. (2010). Effective teacher professionalization in networks? *Teaching and Teacher Education*, 26(4), pp1031-1040.
- [7] Miles, M. B. & Huberman, A. M. (1994). *Qualitative Data Analysis: An expanded Sourcebook*. Sage Publications
- [8] Guskey, T.R. (2000). *Evaluating Professional Development* Thousand Oaks, CA: Corwin Press
- [9] Hatton, N. & Smith, D. (1995). 'Reflection in Teacher Education: Towards Definition and Implementation', *Teaching and Teacher Education*, 11 (1), pp33-49