

**Challenges to the creation of a knowledge product in a cross-functional,  
geographically dispersed virtual team.**

Denise Thursfield and Steve Armstrong  
Centre for Management and Organizational Learning  
Hull University Business School

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## **Introduction**

This paper is a work in progress. It describes the development of a geographically dispersed, cross functional virtual team. The research on which the paper is based is ongoing and findings are necessarily tentative and provisional. In October 2004 a group of European partners came together in a European Union Socrates funded initiative to develop a learning programme that would satisfy the needs of managers of lifelong learning across Europe. This is a 2-year project due to finish in September 2006 culminating in the delivery of a training course for these managers. For the purposes of the paper, the project will be referred to using the pseudonym 'Europroject'.

The main focus of the paper is best described as a 'story of two narratives'. On one hand is the official, formal narrative that sets out the project aims and objectives; its resources, rules and regulations; its formal stages and material artifacts; and its end product, a development course for managers of lifelong learning across Europe. In the context of this official narrative, the course represents culmination of sharing and synthesis of individual participants' knowledge and might be described as a 'knowledge product'.

Set against this official narrative is the informal and unofficial story of the micro-processes and practices at work within the team. This unofficial story presents an alternative version of events. It describes a team that is characterized by conflict, tension, power struggles and failure to reach agreement on fundamental concepts of lifelong learning and knowledge. Taking a practice perspective on learning and knowledge (which will be discussed later in the paper), the knowledge emergent from this collaboration is collectively negotiated tension, confusion and conflict. The course is conceptualized as a material entity; as the materialization of ideas. Material things are concrete expressions of thoughts and are, once produced independent of their creators. (Gherardi and Nicolini, 2003). From this perspective, the course is an element of practice in the construction of knowledge not an end knowledge product.

The aim of the paper is to explore the dissonance between the official and unofficial narratives, and to develop an explanatory theoretical framework. The paper will demonstrate how the use of the practice perspective on learning helps to foreground the ways in which micro-practices can undermine official narratives. It will also show that

reframing understanding of the project's progress within the practice perspective can help the team deal with conflict and tension.

The paper begins with a short section describing the background to the project. It proceeds to a review of contextual literature: namely, literature on virtual teams and knowledge. The literature analyzing virtual teams is useful because it provides a theoretical context for some of the micro-processes occurring within the Europroject. Moreover, the key to understanding the dissonance between the official and unofficial narratives is the concept of knowledge, and the different interpretations of knowledge held by team members. The paper then moves on to a description of the methodology before setting out the findings to date. Finally, our tentative thoughts regarding an explanatory theoretical framework are presented.

### **Background**

The project team consists of 12 individual members from seven organisations spanning six European nations including Estonia, the Netherlands, Bulgaria, Germany, Italy and the UK. Membership of the team throughout the duration of the project has been relatively fluid and changes in personnel representing specific organisations have occurred on 3 separate occasions. Participating organisations are located in a variety of sectors in the learning and training industry. These include a government funded national research council; a private executive training centre attached to a private university (the lead organisation); a self-financing training consultancy attached to a public university; a public university research centre; and 2 private training consultancies.

The academic backgrounds of individual team members representing these organisations are eclectic. These are management theory, organisation theory, social administration, sociology, psychology and philology. Communication within the team is predominantly electronic using a dedicated website or email. The team also meets face-to-face bi-annually, with meetings taking place in each of the six European nations involved. A course testing phase in which the learning programme is delivered in each participating country, and final delivery in Germany and Estonia are also features of the project.

### **Literature Review: Virtual Teams and the Concept of Knowledge**

Geographically dispersed teams are characterized by a common purpose, interdependency of tasks across time and space, and the use of technology to

communicate (Crampton, 2001). Virtual teams have permeable interfaces and boundaries. They form and disperse in accordance with the duration of the project, and consist of individuals with particular competencies (Jarvenpaa and Leidner, 1999). Cross functional teams normally contain individuals possessing expertise in distinct operational areas (Doughty, 1992). Transient and multidisciplinary projects contain features that contribute both possibilities and obstacles to the generation of knowledge and accumulation of learning (Sydow, Lindkvist, DeFillippi, 2004).

Constraints on the performance of cross-functional virtual teams are discussed widely in the literature and a frequently cited problem is lack of common understanding amongst team members from different functional specialisms (Doughty, 1992). Lack of common understanding is a fundamental problem for the Europroject. The paper will demonstrate how competing interpretations of learning and knowledge held by participants from different functional areas constitute a barrier to collective understanding. Problems of communication are also inevitable when communication is mediated by technology. Another important factor is trust which is a vital ingredient in the performance of virtual teams, and the development of trust is closely linked to communication (Jarvenpaa and Leidner, 1999). Communication behaviours to facilitate and maintain trust include social exchanges, expressions of enthusiasm for the task, efforts to cope with technical and task uncertainty, predictability of communication and good leadership. In the example of the virtual team under investigation such communicative behaviours are often frustrated for reasons that will be discussed.

With regard to the concept of knowledge, two competing approaches are key to this story of two narratives. From a psychological perspective, learning is a function of information processing whereby individuals create and/or acquire, store and subsequently retrieve knowledge independently of others or social context (Cyert and March, 1963; Simon, 1991; Levitt and March, 1988). Learning is about events taking place inside the learner and the role of mental processes in the acquisition of knowledge (Shwartz and Reisberg, 1991, cited in Sadler-Smith, 2006).

From a sociological perspective, in contrast, learning is contextual and knowledge is a product of social interaction and collective construction of meaning (Wenger, 1998). Knowledge is socially produced through participation in situated practice and

negotiation. From this practice perspective learning and knowledge occur simultaneously as part of the same process and are one and the same entity (Lave and Wenger, 1991; Wenger, 1998; Gherardi and Nicolini, 2002, 2003).

Team performance is argued to be highly dependent on mutual knowledge (Crampton, 2001). Knowledge has been defined as 'knowing of something - appreciating the significance of patterns of events, happenings and transactions [...] Knowledge has depth - it involves the application of certain collectively sustained criteria in a particular domain of action' (Tsoukas and Mylonopoulos, 2004, pg. 6). It is also subjective and involves the articulation of beliefs and commitment (Nonaka, Toyama and Byosiere, 2003). Knowledge can be explicit or tacit (Polanyi, 1966). The latter is knowledge that people do not know they have (Forsythe et al, 1998), resisting articulation or introspection (Cooper and Sawaf, 1996; Morgan, 1986) and is believed to be a product of learning from experience in real world settings (Nonaka, Toyama and Byosiere, 2003).

Because knowledge is embedded within the situated context of its production, appreciation of significant events happenings and transactions by individuals located in different situations characterized by different norms may differ also. Articulation of competing beliefs and commitment could well result in tension and conflict and a failure to develop collective criteria. Transference of essential knowledge can also be problematic where knowledge is tacit (Sole and Edmondson, 2002).

In the context of the Europroject team, individuals' personal knowledge is embedded in the situated cultural and functional context of their original community of practice. The paper argues that these communities of practice differ in terms of procedural rules, norms and practices, and thus engender widely differing interpretations of the project aims and objectives. They also produce divergence between individuals' beliefs and commitments, and a subsequent failure to sustain collective criteria for the development of the course.

### **Methodology**

The four authors of the paper are team members representing two organisations. Three have backgrounds in sociology and one is a psychologist. Qualitative methodology is employed in order to capture the subjective perceptions and understandings of team members. Team members' perceptions of the situation are important because they affect practice and the construction of knowledge. The initial method of investigation is

participant observation. Data is collected using a research diary, in particular the elaboration of critical incidents. Elaboration of critical incidents enables the foregrounding, through description, of official and unofficial narratives. Analysis of the data involves individual and collective reflection on critical incidents. Individual reflection is carried out by each author. Collective reflection occurs through joint interpretation of events and construction of meaning necessary to the writing of this paper. It is recognized that this approach is subjective and represents only the authors' interpretation of events. Our preliminary findings are, nevertheless, consistent with previous research carried out in the area of virtual teams. Moreover, the second stage of the research will involve qualitative interviews with remaining members of the network following the final project meeting in September 2006.

### **Process and Practice within the Virtual Team**

#### *Critical Incident 1: The Introductory Meeting*

The introductory meeting was held at the city base of the lead institution. The meeting had three formal objectives: to disseminate the formal project requirements regarding issues such as financial regulations and reporting requirements; to allocate roles and responsibilities amongst partners; and to begin the creative task of conceptualizing the product: a week long development course for managers of lifelong learning across Europe. The parameters of future activity were set at this stage by material artifacts in the form of project proposal and documentation on EU funding rules and regulations.

There was some confusion at this early stage over the first and second objectives. Communication errors occurred because of the specialist language used in EU documents. At the end of the meeting the majority of participants remained unclear over some formal requirements of the project. For example, a formal process for testing the course prior to the main delivery was set out in the project proposal, but this was misunderstood by all participants other than the lead institution. Similarly, although roles and responsibilities were allocated, individuals were left unsure as to what work needed to be done before the second meeting.

The creative focus of the meeting was meant to involve sharing and synthesis of individuals' existing knowledge and the collective construction of new knowledge through practice within the team. Various problems began to emerge at this early stage.

Competing imperatives of partner organisations created tension between some individual team members. Team members from private training consultancies were promoting the production of marketable training and development course that would eventually result in profit for their organisation. Team members from academic and research institutions were more concerned with the development of theory, in particular theory that adhered to their own ontological and epistemological concerns. For example, from a training consultant to an academic (sociologist):

What you (DT) are suggesting is no good to me. I cannot sell that to business clients

And from a second training consultant:

This has to be something we can sell to our clients, something they will buy  
Second, there was fundamental disagreement within the project team over the meanings attached to the defining concepts within the project's aim – to develop a course for managers of lifelong learning. Individual participants expressed widely differing interpretations of 'lifelong learning'. For some team members the term lifelong learning is a narrow concept referring to training and development of individuals and groups of employees in organisations. Training and development should, moreover, be carried out by 'expert' trainers. From this perspective, lifelong learning has relevance only in relation to organisational development and performance. For other team members, lifelong learning is a wider concept relating to a whole population. It is relevant for employees, the unemployed, managers and non-managers alike. Lifelong learning encompasses not only organisational development and personal and professional development, but also the economic and cultural development of nations (see, for example; DfEE, 1998; Fryer, 1997, 1999). The following encounter illustrates these contrasting points of view:

Lifelong learning takes place in the company; it is about making sure employees are kept up to date with ideas and practices

And in response:

No, lifelong learning is about widening opportunities for everyone, about giving people the chance to take part in learning whatever their background and circumstances– it's about self-development and self-identity.

A related disagreement concerns the target group for the course. Corresponding to the former definition of lifelong learning is the perception that managers of lifelong learning are senior managers and line managers attempting to initiate and promote learning in their organisation, often against the will of recalcitrant employees who are reluctant to engage in learning. An alternative view within the group is that a manager of lifelong learning is anyone managing in a lifelong learning context. This definition encompasses managers in organisations attempting to implement training and development; managers of training and further and higher education institutions; and managers of organisations that broker learning. A UK example of a broker organisation would be the Learning and Skills Council.

The third area of conceptual disagreement relates to definitions of knowledge. For psychologists and training consultants in the team, knowledge acquisition is an individual endeavor related to cognition. The content or form that relevant knowledge takes is provided by expert trainers. The sociologists in contrast view learning and knowledge construction as a social activity embedded in shared practice and negotiation. It is, of course, unsurprising that individuals from particular academic backgrounds conceptualize learning and knowledge through the lens of their disciplinary allegiance. The problem for this collaboration was a tendency for team members to remain locked within their disciplinary silos, and an unwillingness to acknowledge the validity of alternative viewpoints. The following quote came from a psychologist and was in response to an argument for the incorporation of a social approach to learning in the course:

That's rubbish. There is no such thing as social learning. Learning takes place in the mind of the learner

The counter argument from the sociologist went something like:

No, you are the one talking rubbish. Knowledge is not something you get from completing psychometric tests

### *Critical Incident 2: The Second Meeting*

The formal aims of the second meeting were to review progress to date and develop course modules. Further material objects had been produced at this stage which provided some, albeit minimal, clarity on the direction of the project. These were a report detailing lifelong learning in the six nations, a document outlining the parameters of the proposed



course, and a course website. These objects were not however, collectively developed and individual participants took ownership of what they had produced. The result was further disagreement and dissent. The document outlining the course parameters was, for example, rejected by some team members due to its exclusive focus on the cognitive approach to knowledge and its vision of lifelong learning as training and development within organisations.

It also became apparent at this stage that there existed a temporal disjunction between the formal requirements of the project (as stated in the proposal document) and the creative dynamics. For example, the proposal stated that methodologies for delivery of the course would be produced prior to the construction of modules. Some team members expressed a view that this did not make sense and was unachievable.

In terms of the construction of the course, the formal requirements were to produce outlines of modules to be substantialized in the period between the second and third meetings, and promotional literature. This was problematic because conceptual clarity remained illusory. No agreement was reached on the meaning of learning and knowledge or on the groups of managers to be targeted. Nevertheless, at the end of the meeting, and as a result of the need to move forward, a degree of accommodation was accomplished and responsibilities for subsequent action were jointly negotiated. Shortly after the meeting, minutes were circulated by email setting out what steps had been agreed and the allocation of responsibilities. These minutes did not, however, accord with the memory and understandings of some participants. The result was further confusion and inaction.

### *Critical Incident 3: The Third Meeting*

It became obvious prior to the third meeting that material outputs had not been produced to the satisfaction of the project manager. At this stage the formal requirements were that the course is fully developed and ready to implement during the testing phase, but little work had been done to turn module outlines into modules that could be delivered by trainers. This issue became the focal point of the third meeting. During intense discussions a turning point was achieved. Material objects such as detailed module descriptions, websites and promotional literature were collectively produced, although this was possibly a result of individuals accommodating others rather than joint construction of meaning.

### *Virtual Communication*

In addition to the bi-annual face-to-face meetings, team members communicate through email and the project website. Consideration of the nature and quality of communication is crucial to understanding the dynamic processes at work within the team. Communication between meetings is highly sporadic. It tends to occur in the two weeks before a meeting takes place. Particular communication issues are the technical ability of some team members to access the website; individuals left out of emails; the time taken by some members to respond to email; and technical breakdowns that prevent emails from reaching their destination.

### *The Course*

The outcome of the project to date is a course that lacks clear epistemological underpinnings or coherent underlying pedagogical principles. In consequence it lacks a clear focus of study. Each module is based on the interests of one or two individual team members. There are separate modules on e-learning; national economic and social contexts of lifelong learning; sociological approaches to learning that emphasize the collective construction of meaning; a module containing various psychometric tests, evaluation of learning programmes, and reflective practice. The reflective practice module is further complicated by a lack of agreement on whether reflective practice should focus on the professional development of individual managers or the development of organisations in which managers are employed<sup>1</sup>.

### **Discussion**

Analysis of the above critical incidents brings to light a number of conceptual and processual matters. Conceptual differences occurred over the meaning of lifelong learning and knowledge. Processual issues are communication, the production of material objects as a means of overcoming disagreement and delay, and the notion of peripety vs. accommodation to achieve a timely production of material objects.

Beginning with the former, fundamental conceptual differences over the meaning of learning and knowledge frustrate the official narrative in two ways. First, the ability to articulate beliefs and commitments and to share knowledge is constrained by an absence of trust and mutual respect for one another's opinions. Nonaka, Toyama and Byosiere (2003) put forward a four stage model of knowledge creation that involves socialization

and knowledge sharing. Sharing knowledge, in particular tacit knowledge, requires a relationship that involves dense, long-term social interactions (Dyer and Singh, 1996; Lei, 1997). Long-term social interaction is not a feature of this geographically dispersed, virtual team. Social interaction is sporadic and confined to events during team meetings. Whilst these social events have gone some way towards easing tensions within the group, they have not eradicated conceptual differences.

Failure to develop shared understanding and mutual knowledge results not only from allegiance to participants' academic disciplines; it also emerges from differing functional imperatives. Training consultants, whose aim is to develop a marketable product, draw upon their experience and existing expertise in the area of training to develop a course that meets the needs of their traditional clients: companies requiring assistance in the development of training programmes for employees. Academics in the team are more concerned with developing theoretical understanding of lifelong learning in particular contexts and situations. The existing knowledge of team members is, in other words, situated and provisional (Sole and Edmondson, 2002). It is inextricably linked to the context of its production and the rules, regulations, norms and practices that govern that context. These may be explicit in the form of language and concepts or tacit in the form of embodied capabilities or worldviews (Ibid).

Transferring knowledge from one locale to another is problematic. Barriers to the transference of knowledge in cross-functional teams or settings are defined as knowledge boundaries. Knowledge boundaries include semantic or meaning boundaries, which arise as a result of different interpretations, and practice boundaries that arise as a result of divergent interests (Scarborough, Swan, Laurent, Bresnen, Edelman and Newell, 2004). It was demonstrated in the elaboration of critical incidents that both forms of knowledge boundary exist within the Europroject team.

A further way in which conceptual differences confound the official narrative is that construction of a management learning programme requires some reference to underpinning pedagogical and epistemological principles. Course development is predicated on a clear articulation of what learning and knowledge is, and how knowledge is acquired and/or constructed. The failure of the team to agree on clear underlying

principles has resulted in an unfocused muddle of learning outcomes and disjointed teaching schedule.

With regard to team dynamics, of particular importance is the quality of communication. According to Habermas' theory of communicative action (Habermas, 1984), communication is possible only if there is understanding on the part of each interlocutor of the rationality underpinning the others' interpretation of the situation. This understanding does not need to be agreement; but rather an understanding and acknowledgement of the validity of one another's worldview. In the example of the Europroject team, although there is some understanding of different epistemological and philosophical positions, these are not necessarily acknowledged as valid.

Analysis of critical incidents demonstrates the often bewildering nature of communication, both verbally during project meetings and in terms of electronic communication. Poor verbal communication has affected trust and contributed to confusion in a variety of ways. Failure to reach mutual understanding has overshadowed discussions over what tasks need to be completed by what stage, and which individuals are responsible for carrying out each task. Nor has it been possible to reach agreement on how tasks should be carried out. An attempt to make sense of these meetings and to produce detailed minutes for circulation following meetings is the responsibility of the lead institution. Disputes following the circulation of minutes over what we have and what we have not agreed have eroded trust further.

The problems created by face-to-face communication have been exacerbated by sporadic virtual communication. Confusion has occurred when individuals have not received responses to emails leading to lack of clarity as to the next course of action. For example, emails to a partner institution requesting help with the testing phase were ignored leaving the first partner unsure as to whether to go ahead. It later transpired that this failure to respond had resulted from a technical malfunction with the receiving participant's email system. Requests for information for development of promotional literature have also met with silence, again leading to uncertainty as to what actions should be taken.

It would appear from the discussion so far that the Europroject has been shambolic and relations within the team fraught with tension. A turning point of sorts was, nevertheless, reached during the third meeting when team members realized that inability or

unwillingness to agree had left the project vulnerable to failure. At this point efforts were made to produce material entities in the form of course materials.

The production of material entities has provided a focal point for compromise and accommodation within the team. Detailed discussions over the wording of module specifications, website design and promotional literature resulted in a degree of compromise. The importance of achieving a concrete material outcome on the development of a project is discussed by Engwall and Westling (2004). These authors argue that when project teams agree on a single conceptualization of an end product, they reach a point of peripety. Peripety refers to the point at which projects turn from disorganisation to common purpose (Ibid). The extent to which the production of material artifacts has achieved a point of peripety or has merely accomplished an uneasy compromise remains unclear at this stage. Nevertheless, if a point of peripety is to be achieved in this project it will occur through practice and the collective negotiation of meaning necessary to the production of material objects.

#### *Towards an Explanatory Theoretical Framework*

In this final section of the paper the discussion shifts in focus from the micro-processes at work within the team towards an explanatory framework. The intention is to further an understanding of the context for practice in cross functional, geographically dispersed virtual teams. The explanatory framework put forward at this stage is provisional and speculative. Further research in the form of interviews with members of the Europroject team is necessary before this model is developed further.

Construction of a tentative framework adapts the theory of project ecologies developed by Grabher (Grabher, 2002; 2004). According to Grabher (2004) the process of creating and sedimenting knowledge occurs at the interface between the core project team, the firm, the epistemic community and the personal networks through which projects operate. These four levels constitute the architecture within which projects operate. The project ecology architecture in which the Europroject is located consists of the core project team; the organisations from which individual team members originate; and wider epistemic communities. Projects, organisations and epistemic communities are linked by the practices of team members. Through their recursive practice, team members contribute to

project dynamics. Organisations and epistemic communities shape and are recursively shaped by practice.

#### Figure 1

Organisations form the communities of practice in which individuals' knowledge is embedded. They comprise of procedural rules, norms, power relations and practices through which situated knowledge is produced. Epistemic communities are defined here as the wider communities of knowledge in which organisations and individuals are located. Epistemic communities are also characterized by procedural rules and practices.

Higher education institutions are, for example, located in the wider academic epistemic community and are shaped by the procedural rules and practices pertaining to research, scholarship and pedagogy. Individuals' knowledge is situated and embedded in both the specific HE community of practice to which they belong, and the wider academic epistemic community. Organisations and individuals may be members of more than one epistemic community. Training consultancies and consultants attached to universities belong to both HE and training communities, and are likely to be influenced by the procedures, practices and situated knowledge of both.

Individual team members are conduits for epistemic and organisational knowledge; they are the point at which interface between the epistemic community, organisation and team dynamics and practices converge. Individuals also bring their own concerns and interests to the project ecology. These interests and concerns are shaped by their practice and position within the organisation and epistemic community. Moreover, the professional profiles of individuals who make up the project team signify a 'specific work ethos and perspective which implies a certain 'cognitive distance' between these professions' (Ibid. 1495). Collaboration is possible if participants are able to understand each other's perspective. Academic concerns and interests are engendered, for example, by the procedural rules and practices of the academic epistemic community; by the need to produce academic outputs. The interests of training consultants are linked to their success in producing a marketable product for their organisation.

#### *Conclusion*

This paper has discussed some of the challenges to the creation of a knowledge product in a cross-functional, geographically dispersed virtual team. It has focused on the

dissonance between the official narrative describing the project and its outcome - a knowledge product that takes the form of a development course for managers of lifelong learning - and the unofficial narrative describing the micro-processes and practices that engender learning and knowledge. The paper has argued that the course for managers of lifelong learning should not be conceptualized as an end knowledge product, but as the materialization of ideas that form an element of practice and consequently the construction of learning and knowledge. The course itself has been argued to lack clear and coherent epistemological and pedagogical principles. The paper has argued that the practice perspective on learning and knowledge enables a better understanding of team dynamics within the Europroject and their effects on the construction of the course. The nature of knowledge to emerge from practice and negotiation of meaning within the team is confusion, disagreement and conflict. The practice perspective also foregrounds the importance of materialization in achieving a point of peripety. Materialization must, however, be a collective process if joint meaning is to be negotiated and peripety reached. The production of material artifacts by individuals that does not consider the views of others has been shown to engender further disagreement.

The paper has also focused on issues of communication through both face-to-face meetings and the virtual environment. Conceptual disagreements over the meaning of lifelong learning and knowledge, and a failure to establish trust were argued to constrain verbal communication. Communication was further eroded as a result of sporadic contact between meetings and interruption resulting from technical failures.

Finally, the paper has begun the task of constructing a framework through which to explain team dynamics, practice and knowledge construction within the Europroject. It has taken the theory of project ecologies as a basis for the explanatory framework and argued that learning and knowledge creation take place at the interface between the core project team, organisations and epistemic communities. Individuals' existing knowledge is argued to be embedded in the communities of practice in which they are located. Namely, the organisation and the epistemic community. Individuals' are viewed as bearers of the procedural rules, norms and practices of organisations and epistemic communities, and it is the practice of individuals that links these three ecological dimensions.

It was stated at the start of the paper that this is a work in progress. The research on which the paper is based is incomplete and the explanatory framework is necessarily tentative. The paper does nevertheless contain insights into the dissonance between the official story of the project and the ongoing recursive practices of individuals.

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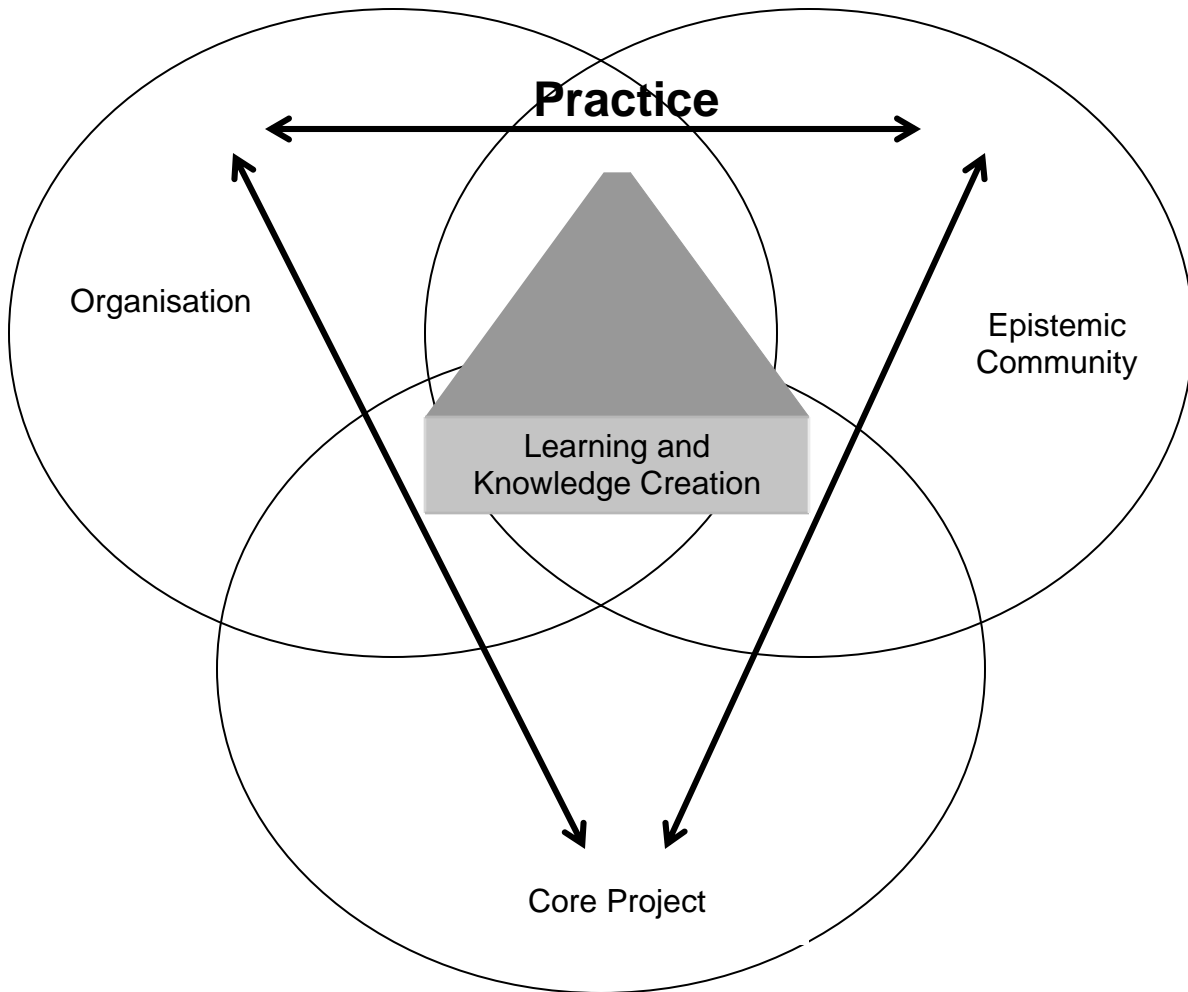
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Figure 1



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<sup>i</sup> This view of the course is based on feedback from UK participants during course testing. It is not only based on the subjective views of the authors.