Trialogical learning in public: FlashMeeting recording and reuse in a peer-learning context

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Abstract: Online meetings are increasingly popular in support of technology-enhanced learning collaboration. When these virtual meetings are recorded and shared in the host community and beyond, they can become artefacts in the learning process themselves and offer significant 'reuse' potential. In a longitudinal study of students working in a peer-support context, we explore how a series of such live events can, over time, develop an important 'trialogical' reuse function. This function is particularly important in peer-supported learning at a distance, and in an international context where shared artefacts that are jointly produced within the community can be the focus of new and effective learning conversations.

Keywords: FlashMeeting; videoconferencing; live online meetings; peer-learning; learning object reuse.

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1 Introduction

Much is claimed about the impact of Web 2.0 as a force to allow 'consumers' to create a new world-wide-web, as much as 'producers' created Web 1.0. New technical innovations, such as wikis and blogs, now support this rapid publishing by users themselves. However, it is still quite hard to use and reuse video materials online, as most video solutions require significant technical knowledge on the users' part to encode, process, edit and publish. In this paper, we will explore one form of complex video production that can, in principle, be used for instant publishing, with almost no extra effort and cost: the online meeting. One really innovative use for this is in allowing distant learners to capture and share their own meetings with each other.

The use of electronic telecommunications for live learning events is far from new, and began with the telephone for audio conversations (Davies, 1987), and in more recent decades, has evolved to incorporate video through the use of hardware

videoconferencing technologies (Kies et al., 1997). The rationale behind the development of conferencing technologies is the ability to host events with remote associates without the need to incur travel costs, and to collaborate with remote colleagues in ways which would otherwise be impossible. Since they began, these events have been recorded for a variety of reasons: for security, to make business records and even for reuse. Many studies have been conducted into the use of videoconferencing, both hardware and now software, and the way in which this medium of communication has an impact on the character and efficiency of meetings (Egido, 1988; Hirsh et al., 2005; Sellen, 1995). However, there is very little research into how these events may be effectively reused. Like business meetings, live learning events, such as lectures, seminars and other group working meetings are typically conducted as an end-in-themselves rather than to be reused (Fischer and Tenbrink, 2003).

Recently, a variety of groups have begun to record events such as lectures and seminars in a single physical (live) location. Some effort is usually required to reedit and repurpose these recordings so that they can be effectively reused as learning assets by students (Scott and Eisenstadt, 1998). However, some recent research has been looking at recording 'online' meetings (conducted over a range of locations) so that they can be reused in a variety of different contexts (Cutler et al., 2002; Quemada et al., 2003; Waibel et al., 1998) and some commercial systems now offer the ability to make recordings of live meetings instantly available for such reuse. There is, however, little understanding of the pedagogical impact of such new artefacts on learning communities.

Trialogical learning theory concentrates on the interaction of learners through common objects of learning activity (Paavola and Hakkarainen, 2005). It contrasts with the 'dialogical' interaction between people, and indeed with the 'monological' processes that occur within the mind of the learner. Typically, learning events such as tutorials, workshops and lectures have (at best) a dialogical, transient function. However, some learning models now focus on the effective use of artefacts around these events (course notes, discussion forums, wikis, etc.) created by learners and mentors. These artefacts can have a trialogical function as 'learning resources' if they become the focus of new joint learning activity. In this study, we start to consider how the dialogical events themselves can become reusable artefacts in new learning, and therefore take on an effective trialogical function. The repurposing of objects which were built for one instructional purpose and can then be used for others is a very interesting field in pedagogical research, as is the reuse of the objects themselves (Koper and Manderveld, 2004). The focus of this paper is on the impact of how 'meeting in public' can convert into the 'reuse of meeting in public' by an extended learning community.

A number of innovations have made this topic a timely one to investigate. Many institutions are now opening their 'learning objects' repositories to a wider learning community. For example, the OpenLearn initiative of the Open University in the UK will release a large range of 'designed for learners' open courses, free to the world (see http://openlearn.open.ac.uk/). This ambitious programme of open distribution of the artefacts of learning is intended to go hand in hand with the learners own learning artefacts. As soon as it becomes easy to conduct, record and share new learning experiences, then the potential trialogical impact of these new artefacts becomes worth measuring.

2 The study

The data presented here is from a longitudinal six-month study of a cohort of around 100 students studying a 'wholly online', high quality and evidently well-respected 'animation' course operated by a prominent North American company. This company has a 'mentored distance programme' in animation tools and techniques, both traditional and digital. Students from all over the world are provided with online video tools, case-studies and discussions with animation professionals. The duration of the distance programme is around 18 months and students can use the company virtual learning environment for their work. Within this environment, the learner can work through the course materials, use their own web space to publish assignments, post to a forum, use text chat and a variety of other things. The course has 12 modules, and for each module, the student has an online tutor/mentor to guide, support and evaluate them. At the time of the study, the company offered live individual interactions between mentoring staff and students, but no live audiovisual group work.

The FlashMeeting™ research team were contacted by an individual student in September of 2005 and asked if it would be possible to use our web-based video meeting system. This student was issued with an account that allowed him to book unlimited meetings for up to around 25 synchronous live participants. The only constraints placed on this use of the system were the ethical considerations that meeting attendees should understand that these events were 'on-the-record' and would be used for research purposes. The FlashMeeting™ system ensured that all meeting recordings were made automatically, instantly and freely available for review by all participants, and it is clear from the logs that event attendees understood these ethical constraints. Indeed, due to the nature of our environment, it is possible for us, as researchers, to know only one student – the 'meeting booker' whilst all others could remain anonymous. The events were not formally made available to any other parties, including their teachers or mentors in their learning programme. All interactions were conducted entirely 'naturalistically' and by the students themselves, with their own rules and management.

The Animation Student community began to meet using FlashMeeting™ in September 2005, and continued to use this environment for over a year and a half (to date). They have used this system to conduct a large number of peer-support events during which students show their work to each other and comment and critique it. In May 2006, we conducted a series of eight interviews with a sample of participants, which are used here. For the purpose of this study, we have sampled the live events in a period in the middle of the students' eight-month interactions up to the May interviews. The first month of data was discarded as it contained a number of 'testing' and exploratory events. The last month was incomplete at the time of the sampling. Therefore, we have chosen to focus upon a six-calendar-month period to study in detail (from October 2005 to March 2006 inclusive). Over this six-month period 99 meetings were conducted, ranging from 90 to 120 min each. Between 2 and 34 people attended each individual meeting in this sample, with an average attendance of 10 per meeting. The total amount of 'meeting time' in this six-month period for this community was around 120 hr. The advantage of a longitudinal study, conducted over this time, is that it gives a very clear view of the activity. We also have recording access logs including all of this time, and up until nearly a year thereafter.

2.1 The live system

The FlashMeeting™ research is part of the 'Network of Excellence' PROLEARN funded by the Information Society Technology programme of the European Commission, which is focused on technology-enhanced professional learning (see http://www.prolearn-project.org/). The Prolearn network brings together both academic and industrial partners with expertise in e-learning, and has deployed a number of cooperative learning and meeting/organisational tools to assist in its work. FlashMeeting™ is a 'lightweight' videoconferencing tool deployed in this network. It is a small applet embedded in a web page. The applet is implemented in Adobe Flash™, which is a pervasive, cross-platform, browser plug-in, and consequently, can be used by most people without any additional software installation. Only one participant, the 'meeting booker' required an account with the server. All other participants simply joined the meeting by clicking on the meeting URL, which is generated by the booking process. A significant usability feature, with respect to reuse, is that the same URL also provides access to the recording of the event, after the live 'booking' has finished. As there are no access or permission keys, the possession of the URL is the only requirement for access to both the live event and the recording.

The FlashMeeting™ model uses a turn-taking, 'simplex audio' approach to meetings, with only one person talking at a time-effectively 'broadcasting' to all others. Meeting participants wishing to speak click a button to raise a symbolic hand thereby joining a queue. If necessary, users can jump the queue via the 'interrupt' button. The client interface consists of regularly updating thumbnail images, alongside the larger, streaming video feed of the person who is currently speaking. Additional channels of parallel communication are provided via text chat, emotions and voting (see http://www.flashmeeting.com/). It is clear from the large corpus of recorded materials of this large community, that students found the live interactions to be both easy and powerful.

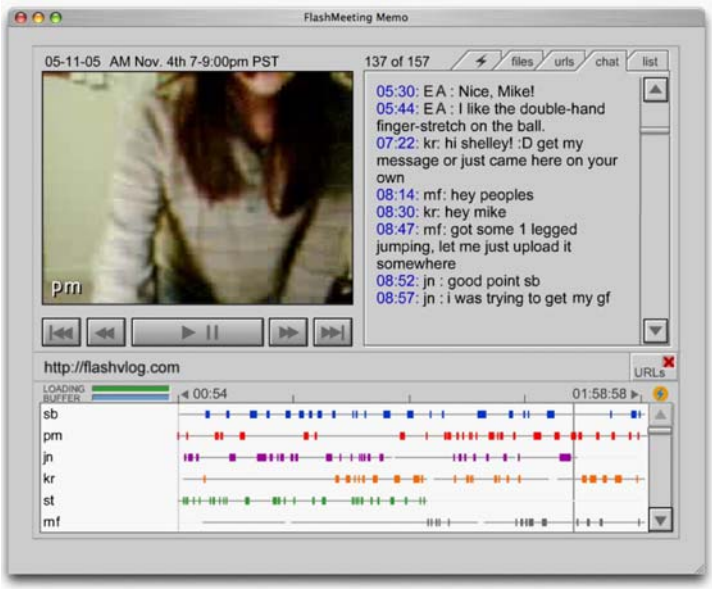
2.2 The replay system

The automatic recording, publishing and syndicating part of this system is called FlashMeeting Memo™ (see http://www.flashmeeting.com/memo/). The 'Memo' replay provides a simple set of visualisation tools to assist in the navigation of the event. The meeting recordings identify all the actions of participants against a 'time-stamp' record in the meeting. Each action (broadcast, text chat, URL sharing, etc.) is a 'tag', which can be joined to the meeting replay URL to jump to that time in the recording. This facility means that a recorded meeting can be 'annotated' and shared within a community, or used as a learning resource itself.

Figure 1 shows a screenshot of the Memo recording applet replaying a November meeting of the Animation Student community. The recording image has been edited to preserve the anonymity of participants. The horizontal bars towards the bottom of the figure show the broadcast video segments of the most active six participants in this event. Each horizontal line represents a speaker in the event. The lined visualisation puts the speakers in order of the proportion of the event that they are speaking. This event was 2 hr long and had 12 participants, but only the 'top 6' participants are shown in this figure. The interface allows this area to be 'scrolled down' to reveal the contributions of the remaining participants. Hence, the top line of Figure 1 shows user 'sb' who spoke the

most in this event overall, whilst user ‘pm’ spoke the next most frequently and so on. The vertical line over the visualisation (to the right hand side of the figure) indicates that the applet is currently playing a segment near the end of the recording. It intersects with a segment by the user ‘pm’, and the video window to the top left shows the image of user ‘pm’ currently speaking (and clearly just having changed her camera angle).

Figure 1 FlashMeeting Memo™ applet showing an Animation Student event



For the FlashMeeting Memo™ replay, the applet allows users to click on any part of the visualisation to replay from any point, and to pause or jump from the controllers below the video window. In addition, the text chat (shown in the right hand top pane) is time-stamped also, and can be used to jump to the point in the event when the text comment was made. This interface allows the recording user to navigate through and browse the recording data very efficiently. Reusers can quickly pick out individual contributions and focus upon them. For example, if interested in what user ‘sb’ said, a reuser could just click on each bar of the top line in Figure 1. Alternatively, a reuser could note that animating ‘one legged jumping’ for a working assignment was discussed in text chat around 8 min and 47 sec in the meeting (see the text chat box to the right of Figure 1) and could click on this text chat line to jump direct to the discussion in the event. In the same way, all other features of the event are ‘time-stamped’ in the applet and can be used to assist the browsing reuser, for example, when a URL is launched for all to discuss, etc.

This set of ‘power-browsing’ features of this replay visualisation makes the recording much more usable for reusers of the event than a plain, unstructured video recording would be. All surveyed users reported the automatic recordings as very useful.

> “Yeah, that’s an awesome feature. The recording feature always helps me so much, because it’s not every time I can attend the meetings” (Male student interview, 11 June 2006).

3 Understanding event reuse

For the purposes of this discussion, it should be noted that these events were primarily communicated to this community as 'live' events, where the existence of the replay was not strongly advertised beyond the attendees. The URLs are available in e-mail messages amongst the students, and in their common 'intranet' online forum. The events do not appear to have been made available outside the Animation Student community studied here during this survey period. It should also be emphasised that these online meetings are primarily designed for live interaction in this restricted community, so, they are relatively informal and unstructured sessions with strong social aspects running alongside the students' working debates. They consist of many hours in which students discuss each other's assignments and work informally, whilst also taking time to interact socially.

There were no formal incentives (positive or negative) associated with participation or reuse of the events, which were entirely student driven and managed. It should also be noted that, in common with many student cohorts, these students had a great deal of work to do in their study, and so had little free time for learning activities that they did not deem to have a significant 'pay-off' towards their work on this commercial course. It is therefore very striking that the unanticipated reuse of this large corpus of events has become such a significant feature in this community. In this analysis, we will explore the who, why and how of the event reuse. Finally, we will consider the impact of the reuse on these learners.

3.1 Who reuses these events?

From December 2005, a live peer-to-peer meeting series became part of the established routine for this group of Animation Students. Participants attended 99 live meetings over the selected six months sample from 24 different countries (measured by the internet address of their Internet Service Provider) whereas students in 32 different countries had viewed the recordings of the events over the subsequent year. We will consider one typical example in some detail.

On 23 February 2006, a live student meeting was held lasting 1.5 hr (starting at 03:30 Greenwich Mean Time, being convenient for North American time zones). The event was attended 'live' by 14 students (2 Australians, 1 Canadian, 1 Indian and 10 from states all over the USA, from Texas to Alaska). The event URL was posted on the forum used by the Animation Student community and discussed in their e-mails to each other. No special or unusual actions appear to have been taken to syndicate or advertise the recording of the event to the wider community, save that the URL address continued to be available in student forum discussion.

At the three-month sampling of the reuse of the 23rd of February 2006 event, 37 individuals had reviewed this recording. Of these, 7 had attended this event; 7 had attended other events in the series and 23 had not attended any of the 99 live events in this sample. At this sample point, this event was reviewed on an average 1.5 times per user, as around half of them viewed it twice (i.e. on two different days).

The final tally on the impact of this event was 72 reuses by 42 identifiably different students in this cohort (with no more reuses after eight months post-live-event). The date statistics clearly indicate that live attendees reused this event within one month, other live meeting users accessed it within two months and all subsequent accesses were by users who had never attended a live event in our sample.

The meeting attendees themselves only reviewed this particular event in the few weeks after it had ended, and not thereafter in our logs. Looking at the 7 attendee reusers, they were evidently very active in this community, indeed in this 99 meeting series over six months these particular 7 students attended an average of 17 live events (approximately 3 each month). For these students, the reuse appears to have been motivated by reviewing the content of the event again; to remind themselves of what was said about their work, and even what they had said about the work of others.

> "… I do go back and look at some things, because I might have missed them, I might have gotten distracted" (Female student interview, 29 May 2006).

This example live event was conducted near the end of our six-month event sample period. At the sample collection date in March 2006 (being one month after this event) 12 of the 14 'event attendee' students had reused at least one other event in this sample. This means that only two of the attendees at this particular event did not appear to have viewed any of the recordings in the six months (including this one). This pattern seems to be representative of this Animation Student FlashMeeting community. Attendance at a live event was highly correlated to reuse of the recordings of other events, as 'active' community members clearly wanted to 'keep in touch' with the work of their peers.

For this particular example event, seven students who attended other events (but not this one) viewed this recording. Reviewing the logs for nearly a year of activity after this event, they all did so within two months of the live meeting. For these reusers, the motivations appear to have been to 'catch up' with the work of their community during an event that they were unable to join. The content of the event was clearly still very important to this group, but they also shared some 'social' motivations as the events were clearly viewed as a way to help them to feel 'connected' into this community of learners. With a very large group of disparate distance learners, particularly adults who are often in work, or in other contexts, which do not suit specific event times, it seems that this aspect is particularly valuable. It may not be surprising that a live online student peer-group is a powerful learning format. However, it is surprising that such informal events should have so long an impact after they have ended.

> "I think it's great, … because if somebody couldn't get in the meeting, if someone missed the meeting, they can go back and review it. So, I think it's really helpful" (Female student interview, 3 June 2006).

This 'long tail' impact appears to be exclusively of benefit to a third community, who have never attended any of the sampled live events. This final group of users might conventionally be branded 'lurkers' (Preece et al., 2004; Takahashi et al., 2003); those who evidently wished to view the peer-to-peer work of their fellow students, but not to contribute to it via a live interaction. However, the contribution to a live event and the contribution to an asynchronous forum or bulletin board are not quite comparable. It is generally argued that the lurking user of a text-based forum can easily contribute and yet chooses deliberately only to consume. As we have already noted, it can be very difficult for even highly motivated users to join a synchronous environment, given international time and date issues. In addition, the sampling we have used is an interesting but strictly limited tool. We can only tell that a reuser, seeing a recording some months after the event, did not appear to take part in the 99 meetings of the six-month sample. We cannot say that they did not take part in the ongoing series as it continued after this time. The narrow window of the three-month post-event statistic is the most likely to be a clear view of the 'non-contributing' event reusers. The picture it shows is a highly

international cross-section of the student cohort. Some 13 of the 23 non-contributing users were USA residents, whilst the remaining 10 came from Austria (3 students), Canada (2 students) and one each from Germany, Iran, Ireland, Romania and the UK.

Some students use the recordings to browse the work of others in a large community to see what their peers are saying, both to 'benchmark' their own learning conversations and to pick up on new ones. Indeed, the concept that all this work is 'common' to the community and 'public' within the community is clearly a valuable part of the learning conversation.

> "… I've had such a great experience with 'Frame Grabbers' where we watch clips of animated movies and so somebody started another club called the 'Breakdowns' where we watch clips of live action in order to help us in our acting choices when we animate, so I'm interested … I mean I felt that these meetings are so useful in so many ways that I'm interested in joining the other club as well, so I was trying to look at one of them saved meetings of that. … to see whether, you know, I really wanted to join that one as well" (Female student interview, 29 May 2006).

So, for instance, this student reflects the view of these meetings as learning 'clubs' which are themed after the students, own ideas of different learning activities (named after their learning 'genre' as animators). Far from lurking, she is an active contributor to a range of community activities, but also clearly is interested in browsing new activities to assess how valuable other conversations may be to her.

3.2 Why and how are these specific events reused?

Most of the reuse issues of meeting attendees are related in some way to the content of the event. The possession of the meeting URL corresponds to a form of 'event ownership' for these users and it is clear that all the most active ones in the live events are also the most active in event reuse. Most of this content-motivated reuse is fairly obvious, as a valuable archive of the students' own work and a source of things they may have missed. Some students report that the recordings are radically refocusing their conventional note taking activities (if not entirely changing them).

> "… some people, when we show their work, its nice having the recording because they don't have to take notes. They can just refer back to the recording and get that feedback and so they are not distracted while somebody is providing them feedback. … so they can still continue to participate without having to take notes" (Male student interview, 10 May 06).

As a means of delaying note taking, students assert that they can concentrate on what is being said at the time, actively participate and then in their own time, post-meeting, extract the useful points in note form. FlashMeeting™ allows users to bookmark and annotate events directly (with individual URLs for any time in the event) however, these students did not use this feature. As FlashMeeting™ was independently provided and not integrated into their course, it is clear that a separate note taking mechanism for their work was essential to most of them.

For those who did not join the live event, it can still offer valuable 'content' where some students' work can be reused by others, almost as a 'guided tour':

> "The one circumstance I know where recordings are used is, like I said, for the meetings I set up, where we look at specific films, film clips. I know that people who aren't able to make it to those meetings who are either in time

> zones that are inconvenient, they go back and look at the recordings and they can follow along with the film clips online with what people are talking about, kind of like, you know, guided tours through museums where you get a headset and they tell you to 'walk this way'. You can sort of do that online" (Male student interview, 28 May 2006).

Clearly, when student work extends out from the simple peer-to-peer model of the basic events and the students invite external visitors to join them, this generates significant interest in the content of the recording from those who could not attend the live session. In this way, these recordings can act as the recording of lectures or workshops would do, outside the peer-to-peer context:

> "I've been fortunate enough to ask some bigger people in the animation industry to come on and talk about work that they've done on movies and those meetings tend to fill up pretty quick since the room is only limited to 25 people. So if anybody can't get into the meeting, the recordings are really useful for that for people" (Male student interview, 28 May 2006).

Most students however, have reported that they do not use recording so much for the learning content, either expert or peer, but as windows into their community. One such use is 'to see who is doing what' in a general awareness context:

> "Personally, I've looked at a couple of recordings. Sometimes just to see, you know, if a certain number of people have shown up and just press the skip forward button a couple of times and see if there's any interesting topics being discussed, but in general I don't look at the recordings too closely" (Male student interview, 28 May 2006).

This social role for the event reuse is frequently cited, and has a potentially powerful role in maintaining the community. It is certainly worth detailed further research. This 'group awareness' function for event recordings could possibly be an invaluable asset to such distant and loosely coupled communities.

Students appear to deploy a range of different reuse techniques as they look at the recordings of events. Some students reported that they made different use of the recordings depending on their own role in the meeting. Students who are motivated by seeking useful content can carefully pick back over points that they missed or did not understand in a live event they attended.

> "I use them quite a bit. If I'm in the meeting and I put up a piece of … my assignment for a critique, it's very helpful to be able to watch that replay and be able to hear what they've said again. If I didn't catch something or if I was trying to fix something, it's so useful to be able to go back. And maybe if I didn't understand something on the first time they said it, I can go back and listen to it again and be able to finally figure out what exactly they were talking about. … Where, if I missed a meeting I'll generally start at the very beginning and play it start to finish" (Male student interview, 15 May 2006).

This student comment covers both perspectives and is representative of how many students say they use these events. They will browse though them for specific things, or leave them playing in the background to get a more general 'feel for what is being talked about' in something they missed.

For students who are part of the live meeting community, reviewing events that they missed appears to be an important way to benchmark their current 'learning conversation' with those of their peers. The multimedia browsing features of the replay applet appear to be widely used for different types of event browsing.

> "… I definitely skip around. If it's something where I missed the entire meeting … I'll let it play through in the background and you know, flip back to it when I hear something that you know, sparks my interest. But usually I'm pretty sure what I want to hear, so I can fast forward right to that person and then check out what I missed" (Female student interview, 03 May 2006).

4 Conclusion

In this study, we have reviewed the reuse of live event recordings by an innovative peer-learning community of students. The students invested a substantial amount of their learning time into live public and online peer-critiques of each other's work. An extended community of students, well beyond the live attendees themselves then invested significant time into the reuse of these peer-to-peer exchanges. The logs of this reuse indicate that they have become significant artefacts in the learning processes of this community. Students used the recordings to mine them for valuable content, but also as a form of 'communal consciousness'.

When recording and sharing of public events becomes invisible and routine in a powerful community of students, the students' work takes on a strongly trialogical aspect as the artefacts of the live events, the recordings, become vehicles of learning and further communication. Indeed, it is also clear from the students' use of these artefacts that they are used trialogically as forms of 'learning conversation' that can be extended from people to include objects themselves. There seems to be a sense in which the activity of this community is an embodiment of the sort of 'Knowledge Building' (Scardamalia and Bereiter, 2003) communal process that is potentially very valuable to learners. This is true not just for event attendees, but for a wider community, who can see other students' hard work and can identify their work as learning, encouragement, reinforcement and reviewing resources.

In this study, students did not edit the recordings nor appreciably annotate them via the tools provided. The students appeared to find that simple live learning conversations and 'show and tell' sessions were sufficient for their needs (and indeed beyond their expectations). It is likely that the user interface for the potentially powerful 'extra reuse' features did not encourage the students into the extra work involved. It is also clear that the events were not deemed at the time by students to be worth the effort of extra annotation or editing. It is possible that other learning models, other than peer-to-peer discussions, may find more value in adding extra layers of complexity in live meeting reuse.

This increase of 'community created' learning object sharing and reuse is now an important research topic for technology-enhanced learning. For instance, in the Open University Openlearn project, discussed in the introduction, the LabSpace (see http://labspace.open.ac.uk/) is designed around the premise that learners and teachers can work together to create new learning resources that can then be shared with the world. The FlashMeeting™ system used by the Animation Student community in this research is now available 'free to use' via this project. Whilst the Animation Students' learning conversations discussed here, are private, there are already a significant number of communities that are learning to work 'fully in public' (Scott et al., 2007), for the benefit of the wider learning world. A range of public recordings of events akin to the ones we have just examined is available via the OpenLearn Labspace and the FlashMeeting system itself (http://flashmeeting.open.ac.uk/public/). It remains to be seen whether

significant reuse will be made of this new world of learning artefacts, but the experience of the community reported upon here suggests that it is likely to be very powerful, both to enhance learning outcomes and to help build and maintain learning communities.

It is clearly the case that 'working and learning in public' is now here to stay.

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