

How Do Teachers Appropriate Learning Objects Through Critical Experiences? A Study of a Pilot In-School Collaborative Video Learning Lab

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Abstract

Questo studio longitudinale di due anni esamina gli effetti collettivi e individuali di un laboratorio di apprendimento collaborativo con video (CVLL) in una scuola secondaria inferiore francese con alto grado di povertà. Il CVLL è stato progettato per: i) determinare i learning object condivisi dai docenti in servizio in base alle loro reali attività di insegnamento e ii) incoraggiarli a partecipare ad un'indagine collaborativa sulle attività videoregistrate concernenti il learning object condiviso selezionato, con l'obiettivo di sostenerli nel fare proprie pratiche di insegnamento più efficaci. I partecipanti sono insegnanti novizi in servizio (n=2) e insegnanti facilitatori esperti (n=2). I dati raccolti consistono in un'analisi incrociata delle registrazioni video (n=37), da i) attività didattica in aula (n=11), ii) sessioni CVLL (n=6), iii) osservazioni e commenti degli insegnanti su entrambi (n=20). I risultati mostrano che gli insegnanti hanno vissuto esperienze significative nel CVLL per quanto riguarda il learning object condiviso e che essi hanno trasformato la loro attività come insegnanti, mentori o facilitatori.

Parole chiave: insegnanti; scuola secondaria; sviluppo professionale; formazione in servizio; appropriazione.

Abstract

This two-year longitudinal study examined the collective and individual effects of a collaborative video learning lab (CVLL) in a French lower-secondary high-poverty school. The CVLL was designed to: i) determine the learning objects shared by the in-service teachers based on their actual teaching activities and ii) encourage them to participate in a collaborative inquiry on their filmed activity regarding the selected shared learning object, with the goal of supporting them as they appropriate more efficient teaching practices. The participants were novice in-service teachers (n=2) and experienced teacher-facilitators (n=2). Data consisted of cross-analysis of video recordings (n=37) from i) classroom teaching activity (n=11), ii) CVLL sessions (n=6), and iii) teachers' observations and comments on both (n=20). The results revealed that novice and experienced teachers lived critical experiences in the CVLL regarding the shared learning object and show how they transformed their activity as teachers, mentors or facilitators.

Keywords: secondary teachers; professional development; in-school training; analysis of work activity; appropriation.

1. Introduction

Recent research on video-based professional development suggests that future studies should focus on i) how to create and sustain a professional community in which learning in and from practice through video analysis is the collective goal (van Es, 2012) and ii) what type of school-based setting best promotes such a community (Brouwer, 2011; Gallimore, Ermeling, Saunders & Goldenberg, 2009). In agreement with this priority, we designed a collaborative video learning lab (CVLL) in a lower-secondary high-poverty school, under the auspices of the UNESCO Chair “Educate Teachers in the 21st Century” (<http://www.ens-lyon.fr/chaire-unesco-formation>). This pilot CVLL was designed to respond to the needs expressed by the school principal: i) to build a community space for sharing the most effective classroom management practices for classes deemed to be “difficult”, making full use of the teachers’ existing competencies, and ii) to create a school culture capable of withstanding teacher turnover and increasing student achievement. We assumed that i) learning to collaborate, ii) organizing interactions, and iii) the facilitator’s role would be crucial for sessions in this pilot lab.

In this study, we determined several learning objects from the actual teaching activities of the teachers in this school and selected one: Do the students work with or against the teacher? Our research question was the following: Within the framework of the CVLL, how are the critical experiences related to this learning object identified and appropriated in the activities of a teacher, mentor or facilitator?

Training to analyze and by analyzing work activity on videos

Similar to the model of video clubs (Sherin & Han, 2004; Sherin & van Es, 2005; van Es, 2012) and the change laboratory (Engeström, Virkkunen, Helle, Pihlaja & Poikela, 1996), the CVLL sessions are centred around analyses of videos recordings of teaching activity. In our approach (Durand, 2011), however, analyzing teachers’ work activity means taking into account both the classroom behaviour and experience of the teacher being filmed. This reflects our assumption that work activity cannot be understood without some type of documentation of the worker’s intentional, emotional and perceptive experience. Experience was accessed in individual self-confrontation interviews (SCI), during which the teachers commented on their activity (i.e., that part that can be shown, mimed, told about and commented on in the right conditions) while watching a recording of their activities alongside a researcher who questioned them about the indices perceived in the situation and their concerns, intentions, expectations, emotions, and cognitions (Ria, Sève, Theureau, Saury & Durand, 2003).

The learning objects determined from the analysis of work activity

In the CVLL, the teachers watched both classroom recordings and self-confrontation interviews. In this way, they were confronted with work activity as a whole (i.e., not only what the video showed, but also what was occurring in the mind and body of the teacher who had been filmed). This holistic approach has been found to enrich their analyses of different work activities (Leblanc & Ria, 2014), and “learning objects” (Durand, 2011) that are meaningful for the teachers emerge through comparisons. Learning objects are generally defined by the researcher-designers, but within the framework of the CVLL, they were defined by the analyses of a CVLL steering group composed of researchers and

teacher-facilitators and then proposed to and validated by the participant teachers. The steering group then designed a training environment mediated by the videos recordings of activities related to the learning object. In this environment i) actors are mimetically engaged as they view their own recorded activity or that of other professionals performing similar tasks involving these objects, ii) the expected horizons are disturbed (e.g., what would you do if you were in this teacher's shoes right now?), and iii) past and present experiences are brought together (e.g., what direct or indirect personal experiences does this classroom episode bring to mind?) (Flandin, Leblanc & Muller, in press).

Collaborative inquiry about shared learning objects

To provoke these processes, we designed the CVLL as an “encouraged-action space” (Durand, 2011) – that is, an environment set up to promote activities and experiences likely to induce professional learning by opening spaces for the participants’ possible actions. We expected that the CVLL would thus encourage the teachers to make collaborative inquiries about the learning object. Following Dewey (1938), inquiries involve a concrete transformation within a given situation through close observation and then the generation of ideas for possible solutions. Observation produces the ideas, which, if they are functional, will in turn bring to light new observable elements, and this process will continue until the situation becomes organized into a coherent whole. A collaborative inquiry requires agreement among the inquiring actors (Dewey, 1927).

In the CVLL, the teachers define a shared object of inquiry or a learning object by taking into account their concerns/intentions. Agreement emerges with regard to both the object and what this object is in the activity under analysis. The other actors serve as mediators between an actor and the actor’s activity that is the object of inquiry. The actors thus share the same object of inquiry, and their points of view may differ even though each somewhat incorporates the other points of view. In other words, the other inquirers bring alternative viewpoints that make transformation in the actor’s activity possible “from itself” as the realization of one’s own potential that the differences among actors reveal. We hypothesize that because of these dynamics in the CVLL, inquiry into filmed activity has “training potential” (Lussi Borer & Muller, 2014).

The CVLL inquiry-focused protocol

We therefore designed a protocol with successive stages as a means to stimulate and support the processes of generating ideas for more effective work activities and the appropriation of these objects by the participating teachers. Although at first glance this protocol seems to resemble the inquiry-focused protocol defined for lesson study (Lewis, Perry & Murata, 2006) or cognitively-guided instruction (Kazemi & Franke, 2004), our protocol is not focused only on cognitive dimensions and is not restricted to issues of knowledge acquisition or student learning. Moreover, it is not intended to define universally valid best practices. Instead, it aims to help a teaching collective to identify and bring into action the potential that exists in all work activity as a means to support teachers as they develop this potential in line with their personal intentions and values. The collective nature ensures i) a wide range of viewpoints about the activities, ii) respect for an ethical framework that guarantees the suspension of judgment (Sherin & van Es, 2005), and iii) the relevance, efficiency and deontology of the ideas suggested for transformation. Following the protocol i) results in greater understanding of the perceptions, intentions and emotions of the teacher being filmed and ii) provokes

comparisons between the different ways of organizing classroom teaching in relation with the investigated learning object; moreover, iii) these comparisons prompt teachers to share their critical personal and/or collective experiences.

The inquiry-focused protocol comprised the following stages:

1. except for the teacher who had been video-recorded (VRT), teachers described the objective elements of the classroom situation linked with the defined learning object step by step and with as much detail as possible (positions and postures of teacher and students, type and nature of interactions, teacher's actions, teaching content);
2. except for the VRT, they interpreted the intentions, expectations, knowledge, preoccupations, and emotions of the teacher being viewed;
3. the VRT then confirmed or rejected the suggested interpretations in such a way that the other teachers i) understood more fully his/her experience during the recorded situation and ii) were able to relate the observable facts to the situated intentions and preoccupations;
4. they, then, assessed the pertinence of the VRT's activity based on the chosen learning object by crossing their interpretations;
5. the participants proposed ideas for possible solutions to transform the VRT's activity concerning the learning object, making them as realistic and feasible as possible and compatible with the VRT's intentions.

Appropriation as transformation in work activity

Our research investigates the critical experiences that teachers live during CVLL sessions when they analyze and inquire into work activity linked with a collectively defined learning object. We broadly define work activity as everything an actor is doing at a given moment while performing a professional task. It thus can be characterized as: i) dynamic, because it is endlessly being transformed; ii) situated, because it is adapted to an environment and expresses the points of view of the relevant actors; iii) meaningful, because it produces personal and/or shared meaning; iv) having emotional and affective valence and involving subjective commitment; and v) a source of experience for the actors.

We conceptualized the transformation of "work activity" as resulting from an "appropriation", itself defined as a three-level process of gradually incorporating an object, tool, or device into one's own world, one's own body, and one's own culture. In this conceptual framework, Level 1 is the incorporation into one's own world – that is, identifying and isolating certain elements as distinctly present against a background and attributing critical meaning to them. Essentially, critical meaning is meaning striking enough to cause the actor to question a habitual way of doing something and to consider the need to transform it (e.g., the teacher becomes able to target a difficulty she is having in class and to imagine a new direction for action). Level 2 is the incorporation into one's own body – that is, the object becomes available to the actor for use in carrying out an activity (e.g., the teacher becomes able to try new ways of acting in class to resolve an identified difficulty). Level 3 is the incorporation into one's own culture – that is, the object becomes a standard or reference to indicate and specify situations that arise from that point onward (e.g., the teacher uses a way of acting that is newly incorporated to resolve a previously identified difficulty as a reference point for imagining new ways of acting in similar difficulties). This definition focuses on: i) the temporal dimension of appropriation, ii) other dimensions (e.g., physical, cognitive and social), iii) its active and

creative aspects, and iv) its individualizing and individual dimensions (Poizat, Haradji & Adé, 2013; Rogoff, 1995).

2. Method

Participants and design

Participants were i) novice in-service teachers, ii) experienced teachers, and iii) teachers designated as mentors or as facilitators to help newly arrived teachers adjust to the school. All had volunteered to be video-recorded during teaching and CVLL sessions.

For two years, we recorded the teachers' activity i) in the classroom and ii) during the CVLL sessions. Data were collected six times during Years 1 and 2 (Figure 1 and Figure 2). We also collected data from post-lesson and post-CVLL interviews, which were either self- or cross-confrontation or comprehensive¹.



Figure 1. CVLL Year 1 (2012-2013) and Year 2 (2013-2014).

¹ During the comprehensive interviews (CI), the teachers were asked to identify a positive and a negative reaction to events in the CVLL that had made them think about their own activity.

	Entire data corpus	Data used for this study
In-service teachers involved	17	4
Novice teachers (NT) (≤ 3 years in the school)	8	2
Experienced teachers (ET) (> 3 years in the school)	5	2 (both EP & TF)
Teacher-facilitators (TF)	4	2
Recordings	88	37
Classroom teaching (1 hr)	36	11
Self-confrontation interviews on teaching (1 hr)	26	8
CVLL sessions (2-3 hrs)	6	6
Collective interviews (CI) following CVLL sessions (30 min-1 hr)	10	4
Self- or cross-confrontation interviews (SCI) following CVLL sessions (30 min-1 hr)	10	8

Figure 2. Data corpus.

We present here the findings regarding the critical experiences lived by two novice teachers ($n=2$) and two experienced teacher-facilitators ($n=2$) linked with the CVLL sessions. The two novices are Hugo, a physics teacher, and Mary, a history and geography teacher, both tenured and in their second year at this school. The experienced teachers are Melly, a life sciences teacher and facilitator, 10 years at this school and in charge of the school's CVLL, and Zack, a maths teacher and facilitator, 13 years at this school and a mentor for novices. The data selected for this study (classroom, CVLL sessions and interviews) concern these four teachers.

3. Data collection

The research team was composed of four researchers who analyzed and interpreted the data and prepared the report. Two of the researchers, A and B, worked in the field, participating in the CVLL sessions and collecting the data. The two others, C and D, supervised the scientific and ethical aspects of the study and had access to the data.

Data coding proceeded as follows:

- Step 1. Identification of shared learning objects for inquiry by A and B over the course of the two years of the CVLL. Five objects were identified² and the present article focuses on only one of them: Do the students work with or against the teacher? This object emerged during CVLL sessions 1 and 2; it was labelled by the researchers and the participants, all of whom validated it.

² 1) Do the students work with or against the teacher? 2) What should be done with dropout student? How can the student be encouraged to re-enter the flow of classroom activity with minimal disturbance to the rest of the class? 3) What is the best way to change classroom activities, to make transitions (from written to oral work, from individual work to group work, etc.)? 4) How should the organization of the group be built (from a course to a class) and what guidelines should there be for the teacher and the class so that the students enter the classroom ready to work? 5) How should the end of class be managed (the end of activities, homework assignments, leaving the classroom, interactions with disruptive students during the class)?

- Step 2. A and B selected all the episodes from of the entire data corpus (classroom, CVLL sessions and interviews) for the four teachers that pertained to the learning object: Do the students work with or against the teacher? Thirty-seven episodes were separately identified; prior consent had been given to use 24 of them and consent was given for nine others after selection. Consent was not given for four others and they were eliminated.
- Step 3. Working in two dyads (A&C and B&D), the researchers characterized all the episodes selected by A and B according to the theoretical levels of *appropriation* (levels 1, 2 and 3). The agreement between the two dyads was 82% after a meeting to evaluate the agreement. The remaining 18% were thus eliminated.
- Step 4. The episodes were interpreted in relation to their distribution over time in order to also capture the processes of professional development.

4. Results

We briefly present the cases of novice and experienced teachers, and then the cases of mentors and facilitators, in order to illustrate how the meaningful experiences lived in relation to the learning object: “Do the students work with or against the teacher?” were identified and appropriated in their activities.

Novice teachers: Hugo & Mary

Hugo was filmed in the classroom and his activity was presented in the first CVLL session. During the collaborative inquiry, a rather vehement controversy arose between Hugo and Zack about the standard procedure for starting a lesson (stand up, be quiet, take off coats) in such a way that the students would be ready to work with the teacher. According to Zack, students must first be placed in the optimal learning conditions, but Hugo had skipped this step: “I start right off by talking about what we did last time [...] / for me the ‘rule’ is ‘come in, sit down, pencil case, notebook’ [...] back when I was in school / I didn’t understand why we had to stand behind our chairs [...] / I don’t see why a kid who’s wearing a coat wouldn’t be able to concentrate / so based on that / I don’t want to waste time and run the risk of a conflict with a student / simply to get him to take off his coat” (CVLL, November 2012).

Year 1, we observed two critical experiences:

1i) The emergence of feelings of dissatisfaction with his own activity (while he resisted any change in habits for more than six months): “What I did during my student teaching year [end of university studies] [...] I couldn’t do anymore / the problem is that it wasn’t working here / and I didn’t want to pester them or be bothered myself with the ‘stand up – keep quiet – get out the supplies’ routine / now [in this difficult school] the goal is to get going as fast as possible / I realized I was unable to use any other method” (SCI, April 2013);

1ii) A growing comprehension of Zack’s more efficient activity: “I didn’t see how I could put Zack’s way of doing things [coats off] into effect since I’d been doing it differently for the past two or three months / in fact I would’ve had to give my students a good reason for why I was changing my ways / I preferred to keep things the same rather than attempting something else right in the middle of the year” (SCI, April 2013).

Year 2, we observed two new dimensions in Hugo's classroom activity:

2i) At the beginning of Year 2, he asked the students to stand facing him in silence when they entered the classroom before starting the lesson together: "I defined the procedure right at the beginning of the year / since the CVLL [Year 1] I knew that I had to change things / I waited until the beginning of the school year to do it with a few very simple rules / I tried to explain to them why I was having them stand and wait / the problem I had last year was that I couldn't see the meaning of it all [the standing routine] or explain it to the students / so right from the first hour of class this year / I gave a meaning to all the rules I asked them to follow / if I hadn't been able to back the rules with meaning I think I still couldn't have done it" (SCI, September 2013);

2ii) Hugo is developing a capacity for critical reflexive analysis about his activity: "I didn't know at first how to do any different so the collective pushed me to change my practices / I resisted at first but I continued to think about doing things differently / [...] and then time helps / the fact of seeing yourself on video / analyzing what you're doing and hearing other people analyzing how they set their students to work [...] / that pushes you to think and constantly question what you do, how you work [...] / when you [the researchers] weren't there I always asked myself 'what if the camera was there at the back...'" (SCI, September 2013).

Mary was filmed in the classroom and her activity was presented in the first and second CVLL session. Year 1, we observed two critical experiences:

1i) Identification of difficulties she was having with the learning object, which were hard for her to label: "Here I see the class really differently and this helps me to target the problems I was having but couldn't put a name to" (CVVL, November 2012);

1ii) Comparison of the different episodes filmed in her class, which helps her to spot a recurring problem with students working against her: "[...] the fact that I want them to work independently and yet I'm not managing to let them / I keep going toward them [...] this is the problem every time [...] the sequence filmed this morning / it was the same thing once again and here I really got it / so now I'm going to do something..." (CVVL, November 2012);

Year 2, we noted two critical experiences:

2i) The projection of her activity "as is" onto that of her colleague, whose students work with him, and identifying promising ideas for solutions: "It's completely different from what I usually do so it makes me question what I'm doing [...] in Marc's class lots of things come from the students / the way he's always there but in the background and very efficient, these are things that I can't quite do in my class... But I never really tried in fact... I'd really like to / though" (CI, November 2013);

2ii) Taking into account how she relates to the students, which contributes to her feeling of working against them: "I noticed that I'm critical of the kids without really wanting to be by using negative terms / I'm very careful about this now" (CI, June 2014).

Experienced teacher: Melly

Year 2, we observed two critical experiences:

Melly was filmed and self-confronted during the CVLL for facilitators. Beforehand, she had been self-confronted with one of the researchers. With regard to how she began her lessons, she acknowledged feeling uncertain about whether to begin with an oral or

written review of the previous material because the class is generally rather agitated. She told the researchers: “Maybe it would have been better to start on the written work a lot sooner / but do I get them writing when there are at least ten who won’t know what to do or should I ask them to listen, even though at least three won’t... I don’t know / I have no answers...” (post-lesson SCI, November 2013).

2i) During the collaborative inquiry, she thought of a new idea for quickly involving all the students in activity that she hadn’t imagined before, and this idea grew out of some of the ideas suggested by her colleagues: “An idea just came to me / but at the time it hadn’t occurred to me / and it was to tell myself this: OK, get three students to re-read the definition and then have them explain it to the others [...] And I think that in fact it could be interesting to have them reformulate what they’ve read and then tell the others, giving me a bit of breathing room” (CVLL, November 2013).

2ii) The collaborative inquiry prompted her to think about her relationship with students since she had begun teaching and to attribute new meaning: “The fact that I don’t necessarily have confidence in the students, it’s something like that and I have a hard time letting go of it / And it was already an issue in my first meeting with my teaching supervisors because the university supervisor said to me ‘but you want to make them work so go ahead, do it! stop talking!’ About having confidence in them, I’ve made some progress but there are still moments when I get irritated, when I feel like they’re not doing what I want, and I won’t let go of my lesson” (SCI post-CVLL, November 2013).

Mentor: Zack

Year 2, we noted two new dimensions incorporated into his mentoring activity:

2i) The learning object became his main concern in meetings with the in-service teachers he was supervising in Year 2: “Today [...] my first question is always / do you think you’re working with or against the students?” (CI, September 2013);

2ii) He uses the stages of inquiry while training the pre-service teachers about the learning object and clearly states (and no longer just demonstrates) ideas for possible solutions to achieve concrete and specific transformations: “Seeing the whole film is easy / You stop / you rewind, you write down a few remarks, you go back to something / you discuss it again and take a few notes / it’s so easy / and especially for me because it’s hard for me to present a structured discourse without visual support” (CI, February 2014).

Facilitator: Melly

Year 1, we discovered a new dimension incorporated into her activity as a facilitator to prompt her colleagues to work on the learning object:

1i) When she comments on Hugo’s intention to work with the students, she balances observations, interpretations and ideas for possible solutions that she imagines by taking into account her experience as a teacher or the students’ points of view. She told Hugo: “It seems that you’re quite sure they’re [the students] following you and I’m not so sure that it’s as much as you’d like / because when you say ‘so when we remove a circuit’ / you still have a few asking ‘so is that the conclusion or not?’ / for me / but I don’t know the whole activity, it may not be worth it to insist on everything / maybe a possible direction would be to say ‘stop copy this conclusion’ / I put myself in the students’ shoes / with not much light in the class / you’re trying to copy everything / it’s not easy to follow’ (CVLL, November 2012).

5. Discussion and conclusion

We interpret these results as indications that the CVLL is an environment that prompts and supports i) the emergence of shared learning objects from the actual teaching activities of the school teachers and ii) the processes of appropriation, both with a certain efficacy, and thus it enhances the professional development of teachers. The results show that participation in the CVLL provided the teachers with meaningful experiences (appropriation Level 1) and in some cases prompted changes in their activity as teachers, mentors, or facilitators (appropriation Level 2). They did not show incorporation into their own culture (appropriation Level 3), perhaps because our longitudinal observation was not sufficiently long (the research project will continue for two more years). Of course, the goal is not merely to recognize a state of appropriation but also to better understand the determinants and processes in order to design situations and components that will be appropriable.

For the novice teachers, most of the experiences they shared concerned their dissatisfaction with aspects of their own activity and their attraction to the more experienced teachers' activities that i) they managed to understand, and that, in Hugo's case, ii) he managed to appropriate by giving them new meaning in line with his own intentions and values and iii) he could perform in class.

After the inquiry on her own activity, the experienced teacher, Melly, was able to attribute new meaning to i) the dimensions of her activities that were under analysis and that therefore subsequently became meaningful to her and ii) the lived experiences that had begun ten years ago when she was still in training and had continued as part of her professional practice ever since. This process encouraged her to re-evaluate her way of showing "confidence in the students," and the circumstances in which this is now possible and those in which she still had problems were meaningful to her.

Participating in the CVLL sessions helped Zack, a teacher-mentor, to identify his shortcomings as an educator. In Year 2, he used both the learning object worked on in the CVLL and the video-based approach to activity analysis and incorporated them into his mentoring visits. Yet, although he used these tools, not all the researchers' conceptual framework was meaningful to him and he became aware of this by identifying his reluctance to engage in collaborative activity analysis and his need for additional education. In contrast, Melly began to incorporate the inquiry principles into her facilitator work from the first year, which led her to be concerned with distorting the concepts on which the CVLL is based and to question her role as their transmitter in a language that could be easily grasped by the other teachers.

To set up and sustain CVLLs in other schools, the role of facilitators is crucial. The search for an intermediary role between the teachers and researchers is a major issue, as Melly points out: "If the goal is to be totally independent without needing the researchers / then we [the facilitators] need to invent a new role because we won't turn into researchers between now and the end of the year / and the researcher sees us from the outside and he doesn't have classes either [...] we'll keep on doing classes and we won't become researchers so we need to invent a new role or a new place" (CI, September 2013). This raises three questions for researchers-training environment designers. The first is about generalizability: to have an ecologically viable CVLL that can be set up in other schools, it cannot be dependent on the presence of researchers, as they are rarely available. This suggests that teachers will need to be trained for this role, but how should this be done? The second question concerns the degree of commitment to and the sustainability of innovation in teaching and training in the schools: should all teachers be

involved and, if so, how? How can the desire for both individual and collective professional growth that was expressed in the CVLL sessions be maintained? The third question concerns training policies: exactly what kind of expertise should be developed, and in whom? Who should be trained, and for what?

We believe that approaches like CVLLs have the potential to improve the relevance of teaching activity and workplace training in the schools. They therefore should be of interest to school leaders and policymakers, on condition that certain minimal standards are met, as Brouwer (2011) also demonstrated: i) the CVLL should be set up by researchers with a design-in-use perspective, ii) the CVLL sessions should have guaranteed timeslots in the school schedule, iii) the CVLL must be run according to ethical standards, iv) the core postulates of work activity analysis must be presented to participants in an adapted manner, v) inquiry learning objects should be chosen by inter-subjective agreement, and vi) support needs to be given for the appropriation of new ways to act in the classroom.

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