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Engeström's activity theory as a tool to analyse online resources embedding academic literacies

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Engeström's third generation activity theory, situated within sociocultural theory, can be used to analyse complexities within and surrounding academic activities, such as writing assignments or using online resources. This theory provides a tool to analyse how *individual* or *groups* use *mediating artefacts* (for example, an online writing resource) to achieve a specific *object* and *outcome*. This theory also provides a framework to analyse sociocultural influences of *rules and norms*, *community* and *division of labour* in the same activity system. Activity theory analysis describes these components and examines their interrelationship to identify affordances and contradictions within the system. As an activity system is not independent of other related activity systems, an analysis also considers co-existing related activity systems. Any contradictions can then be potentially addressed, transforming the activity and achieving improved outcomes.

Activity theory can be used in conjunction with other research paradigms, such as action research. Whilst such a combination of paradigms can be viewed as controversial, some researchers use both activity theory and action research. This paper illustrates the value of using activity theory with action research to examine two networked academic activity systems –namely: 1) writing assignments, and 2) providing Academic Language and Learning (ALL) support online – which were implemented over three action research cycles. The analysis of the first action research cycle highlights the potential of activity theory to identify how contradictions lead to change for the activity and the stakeholders in the activity – both academics and students.

Key Words: activity theory, Engeström, action research, assignment writing, online writing instruction, writing support.

1. Introduction

In the field of Academic Language and Learning (ALL), a key focus of academic activity is to embed academic literacies within discipline-specific core undergraduate courses, particularly first year courses. Embedding has become a central principle informing ALL practice in working with international students for whom English is an additional language (EAL) (Australian University Quality Agency, 2008). Prior to the establishment of this principle, many ALL advisers had already successfully enacted this principle by working collaboratively with faculty academics to embed a range of academic literacies within course courses (for example, Gollin, 1998; Skillen, 2006; Skillen, Merten, Trivett, & Percy, 1998). Building on these prior experiences and the establishment of the principles, ALL advisers have continued to explore various approaches to embedding academic literacies into a range of courses and programs, thereby mainstreaming the teaching academic literacies within Australian universities. One shift in approach, mirroring the advent of e-learning technologies, has been for ALL advisers to

explore ways to achieve the same aim by utilising the online medium (for example, Mort & Drury, 2012; Silburn, Flack, Bridgeman, & Warwick, 2012).

Studies of collaborative interventionist approaches to embedding have been analysed through a comprehensive range of evaluation methods, including surveys and/or interviews or focus group discussions with students and staff. Evidence underscoring the success of this approach is mainly provided by revealing improved assessment quality and higher marks by students using the resources provided. For example, Mort and Drury (2012) and Silburn et al. (2012) show that students who used online resources embedded within courses outperformed those not using these resources. Few accounts of embedding, however, take an action research approach to continuously improve the teaching. Furthermore, to the best of my knowledge, no studies as yet have adopted a research perspective to analyse the broader sociocultural context of the teaching and learning activity of embedding writing development in discipline courses using online technologies. A sociocultural research approach can provide a "situated and dynamic view of the cultural practices of a cultural group" (Rogoff, 2003, p. 21).

This paper provides an example of how such accounts of embedding academic literacies can be strengthened by providing a deeper insight into sociocultural influences on this specific teaching and learning activity. These insights are possible through adopting an analytical lens from sociocultural theory, described in more detail below.

Two basic tenets of Vygotskyian sociocultural theory are activity theory, which reflects the fundamental idea that motives of learning in a particular setting are intertwined with socially and institutionally defined beliefs; and mediation, which proposed that human mental activity is mediated by tools and signs, the foremost tool being language (Sullivan, 2000, p. 115).

Activity theory, or more specifically Yjrö Engeström's (1987) third generation activity theory, provides an analytical tool to understand mediators of action and contradictions within the activity of the academics embedding academic literacies. For example, when embedding academic writing resources into a course through the online mode, the focus of analysis can become the contradictions or tensions identified when students choose to *not* use the online resource provided.

The purpose of this paper is to explain activity theory and illustrate how it has been used in combination with the well-established educational research approach of action research. Despite some controversy about integrating these two research approaches, various researchers are exploring this integrated methodology for interventionist research studies in education (for example, Orland-Barak and Becher, 2011). Orland-Barak and Becher (2011) demonstrate how action research can provide a rich description of an educational intervention in a local context, while activity theory can act as an analytical tool to provide a more complex and nuanced interpretation incorporating sociocultural components of the specific teaching and learning context. By way of example, this paper uses data from a research study which embedded academic literacies within a third year computing course using an online mode. The research study investigated the ways in which students with English as an additional language (EAL) in Hong Kong used a course-based online writing resource designed by a team – an ALL adviser in collaboration with course academics (an Australian course coordinator and lecturer, and a Hong Kong tutor) – to improve the quality of the written assignment outcomes.

First, this paper introduces activity theory and then discusses it in relation to action research and the nature of the controversy of using these two approaches in combination. Next, the motivation for the research study and the study itself are outlined to provide a background for understanding the ways in which these two approaches have informed each other to provide an insight into the research question, namely: *What are the sociocultural influences on the design and use of an online assignment writing resource for EAL students in Hong Kong?*

2. Engeström's third generation activity theory

The use of activity theory, initially vigorously discussed in Russia due to the influence of Lev Vygotsky and A. N. Leontiev, has seen a dramatic increase in English-speaking research after

1990 with translations of Russian publications into English. Since 2000, it has also been used increasingly in educational research (Roth, 2004). A key influence of that shift has been Yjrö Engeström who, since his seminal paper on *Learning by expanding: an activity-theoretical approach to developmental research* (Engeström, 1987), has continued to develop the conceptualisation of activity theory and its application in research (e.g. Engeström, 1997, 2001, 2005, 2009; Engeström, Miettinen, & Punamäki, 1999; Engeström, Virkkunen, Helle, Pihlaja, & Poikela, 1996). The central premise of activity theory is that when individuals engage in actions with others or in actions that are mediated by some artefact or culturally constructed tools (such as instructional writing resources) they change the activity and enact the power to change the conditions influencing their activities (Roth, 2004). In other words, students using a course-embedded writing resource to support assignment writing can discover the appropriate *object* of the assignment writing activity and identify how to achieve the object. This theory highlights the role of mediating artefacts and provides a means to analyse "tool-mediated goal-directed action" (Lantolf, 2000, p. 7) in relation to the sociocultural context of the activity. In this study, the tool – the online writing resource – aimed to influence the student activity of writing their assignment. Of interest was how the online tool could improve the quality of course-based assignments written by EAL students in Hong Kong.

Activity theorists examine "…practical social activities. Their concern is with the psychological impacts of activity and the social conditions and systems that are produced in and through such activity" (Daniels, 2008, p. 115). In essence, the Western view of activity theory considers activity as the object of analysis influenced by the situatedness of the activity and the influence of society and culture shaping the *subject* and the activity. An activity is mediated by various components: the use of *tools* or *artefacts*, *rules and norms*, the *community* and roles within a *division of labour*. Based on Vygotsky's and Leontiev's first and second generation activity theory, Engeström developed a multi-layered approach visualised in the increasingly well-recognised triangular model showing the interaction of components (see Figure 1). A change in one component will change the activity system and its *object*. For example, in the *activity* of EAL students in Hong Kong writing their course assignments, the assumption is that the inclusion of another *mediating artefact* (the online writing resource) will cause the *subjects* – the students – to improve the *outcome* (the written assignments).
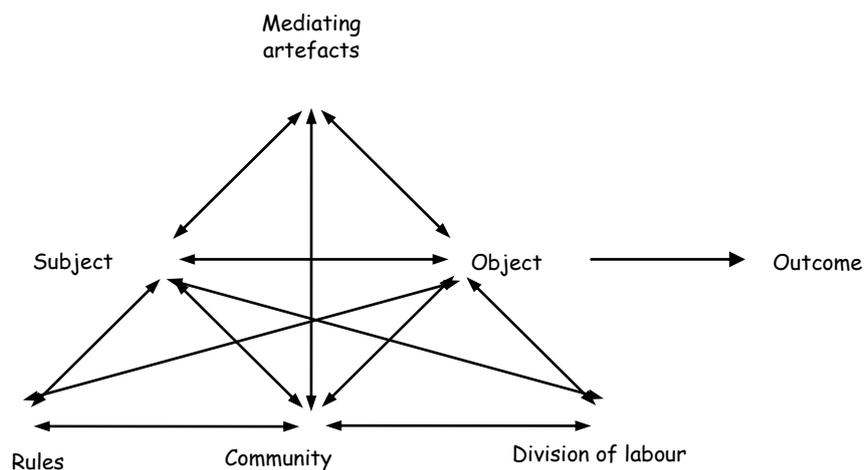

Figure 1. A diagrammatic representation of an activity system.

The first step in an activity theory analysis is to describe each component, before considering the relationships between the components and interrelated activity systems. Central to the analysis are the views of the *subjects* and adherence to five principles established by Engeström (2001):

1. Activity systems as the unit of analysis – the analysis needs to be interpreted in relation to other relevant activity systems to establish the background of the activity system.
2. The multi-voicedness of an activity – heterogeneous voices need to be heard as an activity will be different for each individual, revealing multiple layers and perspectives.
3. Historicity of an activity system – an activity system "takes shape and gets transformed" over time (Engeström, 2001, p. 136) with the analysis uncovering its history.
4. Contradictions as driving forces of change in activity – clashes between "opposite starting points" (Engeström, 2001, p. 137) not only can generate conflict but also reveal opportunities for change.
5. Expansive transformation in activity systems – new understandings of an activity arise from participants addressing contractions and questioning their actions, leading to new possibilities.

These principles were enacted in this study in the following ways:

1. The activity systems of the students using the online writing resource could only be interpreted in relation to the activity of the designing of the writing resource;
2. The voices to be heard in the analysis were the students, the course coordinator, the lecturer and the ALL adviser;
3. The activity system of the students using the online writing resource took shape and was transformed over three interventions, namely three action research cycles;
4. Contradictions, such as the assignment quality not changing, enabled the team to reconsider the approach to embedding the online writing resource; and
5. Expansive transformation occurred as not only was the online writing resource completely redesigned but also the students' engagement with the design in subsequent action research cycles.

Researchers continue to explore novel applications of activity theory; however, in such applications they face the risk of limiting the use of activity theory or not applying it appropriately. For example, Roth (2004) highlights that some researchers may have a structuralist approach to the theory when they interpret the "well-known" triangle in a static way rather than explore the dynamics of the model in which the components constantly undergo change, in relation to historical contexts. No activity or activity system is ever identical. Each time an individual is involved in an activity, through producing an object determined by social norms and rules as understood by the individual, the object is consumed by the individual. In education, where this object corresponds to the expectations of the dominant and less familiar culture, the values and norms of "bourgeois society" are reinforced; if resisting this dominant culture, the outcome challenges educational expectations. The dynamic nature of activity systems is central in the application of activity theory as change is driven through the identification of contradictions or "dilemmas, disturbances and discoordinations" (Roth, 2004, p. 5). Contradictions can be within or between components of the activity system, between the object and a "culturally more advanced activity" or between the activity system and a neighbouring activity system (Roth, 2004, p. 5).

3. The debate about using activity theory with action research

Another issue for researchers exploring new educational applications of activity theory is the compatibility of approaches – for example, the combination of activity theory with action research which is often used in educational research. Action research has an agenda of change within teaching and learning contexts in response to a curricular issue or innovation. The adoption of action research results in a narrativised account of a research context, and has been critiqued as merely telling a 'good story' about a local context. Rather, action research creates knowledge through providing an explanation and critical analyses of stories (McNiff & Whitehead, 2009, p. 2) as a means to solve problems of "major importance" to stakeholders (Greenwood & Levin, 2003, p. 148). Action research also aims to address concerns related to broader contexts that shape and constrain human activity. In other words, action research studies aim to "gain greater clarity and understanding of a question, problem or issue" (Stringer, 2007,

p. 19). Action research, like activity theory, has an agenda of useful social change which is achieved through collaboration between key stakeholders as they aim to discern new meanings through dialogue. In the context of embedding academic literacies, the collaborative efforts of ALL advisers and faculty stakeholders are channelled towards the development of specific academic literacies for the student stakeholders.

The debate about compatibility of these two approaches centres on the argument mounted by Engeström that "Action research is 'not a (coherent) method' and 'certainly not a viable substitute for a methodology genuinely built on CHAT [cultural historical activity theory]' …" (Somekh & Nissen, 2011, p. 93). Engeström's critique is that activity theory is a more thorough method, while action research is too flexible and eclectic. Despite this perceived divide, Somekh and Nissen (2011) argue that these two approaches "share the fundamental assumption that knowledge emerges as aspects of practice" (p. 95) or that research needs to be relevant to social practice. Theoretically, both approaches are: "rooted in the inspiration each derives from Marx's perspective on human activity as 'practical-critical activity' – as praxis. This is a profound perspective" (Collins, 2011, p. 110). Other similarities are: their use in interventionist research considering a cyclical manner of activity over time, the focus of analysis is always the *subject* of the research, the focus on factors influencing change, and, collaborative dialogue between researchers and stakeholders' changes consciousness of the situation. For more detail about this debate, refer to Orland-Barak and Becher (2011) and Wells (2011).

The combination of activity theory and action research has been used successfully in educational research. For example, Orland-Barak and Becher (2011) explain how they use an activity theory lens as a meta-analytical tool for an action research project in education. They used action research to "zoom in" to explore data and activity theory to "zoom out" for a systemic analysis of the same data. The next section discusses how this approach was adopted within a research study of embedding academic literacies within a course with EAL students.

4. The research study

The purpose of this research study was learn more about how students with English as an additional language (EAL) in Hong Kong utilised online assignment writing resources embedded within a third year transnational computing course. This transnational education program is delivered by an Australian university yet taught off-shore in Hong Kong, predominantly by Australian lecturers. This study was motivated by a lacuna within current research studies, namely the limited understanding of EAL students' use of online writing support resources. Furthermore, voice of students in transnational education research is largely absent, yet this teaching and learning context relies on the efficacy of online technologies and most students engage with English not as an Additional Language (EAL) but as a Foreign Language (EFL).

The use of action research provided a means to *plan* the online resource with relevant academic stakeholders, *implement* the resource within the course, and *evaluate* the resource through discussion with student users to ascertain their perceptions, values and deeper meanings (Rearick & Feldman, 1999). The resultant *reflection* by the researcher with the academic stakeholders and research participants (i.e. the academic course team) led to a re-conceptualisation of both the theoretical orientation and the purpose of the resource. Initially, depicting the data via a detailed description using the action research framework did not capture the richness of the data. By contrast, using activity theory as an analytical tool provided a more complex and valuable depiction of the data as affordances and contradictions were identified. This analysis resulted in transformations in the activity systems under scrutiny.

Despite the extensive use of online technologies in higher education and the increasing numbers of EAL students enrolled within Anglophone universities worldwide, still little is known about how EAL students use such resources. Online technologies have the promise of providing new ways for teaching and learning (Brown & Davis, 2004), with recent research investigating the potential of online resources as providing affordances for learning. The concept of affordance enables researchers to look beyond the actual technology or mediating tool to the activities

suggested by the tool. Nevertheless, researchers also need to examine potential limitations of online technologies. For example, in their study on a computer-mediated writing program using activity theory as an analytical tool, Brine and Franken (2006) consider potentials and limitations available to students. They argue that the relationship between the technology, the learner and the object enable learning and change. To perceive such relationships more accurately, in their study, students' perspectives provided ways to interpret how the technology worked (provided affordances) or did not work for (constrained) the students in ways that the teacher could not anticipate.

A vast number of research studies on e-learning have been conducted at all levels of formal education as reflected in comprehensive reviews (see for example, Conole & Oliver, 2007). Conole and Oliver (2007) highlight pedagogical and theoretical issues related to e-learning and argue that digital resources for learning are not neutral but reflect the designers' pedagogical values and beliefs. Furthermore, they argue that while many studies have examined the role of the educator in e-learning, still not enough is known about the students and their use of the technology. They raise over 120 questions which still need to be addressed, such as: "How useful do students find e-learning resources? How are special educational needs being addressed in e-learning? How can we ensure that different stakeholders engage with e-learning in a meaningful way?" (Conole & Oliver, 2007, pp. 16-19).

A review of studies in technology-enhanced language learning or computer assisted language learning (CALL) (Egbert, Huff, McNeil, Preuss, & Sellen, 2009) have identified that, in general, this research lacked a theoretical grounding, lacked a richness of descriptive data especially related to student participants, over-relied on attitude surveys and generally failed to investigate specific local contexts. Egbert et al. (2009) and others claim that CALL research often does not focus on pedagogy and the teacher's role. They call for more research on examining the role of the teacher in CALL classrooms. In their review of CALL research, Egbert et al. (2009) found only twelve studies focusing on writing and CALL. All of these studies were conducted in face-to-face writing classes, none with distance education classes. More recently, as a result of a large survey of online writing instruction in higher education institutions in the US, yet again the call was made for more research aiming to understand how EAL students interacted and engaged with online writing resources (Hewett et al., 2011).

In response to these calls, this study focused on a context with EFL students. The research study was conducted within one course in a transnational program conducted from an Australian university in partnership with a university in Hong Kong. In this context, Australian "flying lecturers" (Dunn & Wallace, 2008, p. xix) taught for 2 weeks in a face-to-face mode and the remainder of the course was conducted in a distance learning mode, supported by online technologies. This course had been conducted in Hong Kong for three years, yet one ongoing issue was that the every study period significant numbers of students failed an important component of the assessment – two written assignments in the form of reports. To address this issue, an ALL adviser was invited to embed report writing resources within the off-shore online course resources. This request was based on successful on-campus face-to-face workshops embedding the teaching of report writing with this course with the Australian on-campus EAL students. This work was undertaken in collaboration with the course coordinator. The resources developed for this face-to-face context were initially used as the basis for the online writing resource for the Hong Kong students.

The research participants included three course academics (the Australian course coordinator and lecturer, and the locally employed Hong Kong tutor) and 18 students enrolled in the course in Hong Kong. All participants were interviewed – 12 students twice and the course coordinator and lecturer multiple times. This data was initially used to provide a thick description of the action research cycles (zooming in) and then analysed using activity theory (zooming out). An example of how this zooming in and out was used to complement each other in the interpretation of the research data is explained in the next section. The example uses data from the first action research cycle.

5. "Zooming" in and out of the data: Integrating action research and activity theory

Action research usually involves four stages: 1) planning, 2) implementation, 3) evaluation and 4) reflection (Kemmis, 2010). In the first stage of planning, the online writing resource was designed by the ALL adviser in consultation with the course coordinator (CC) and the lecturer (L) (the design team). The resource was then placed online within the course homepage in readiness for the implementation stage. The intention was that the students would use the resource and then evaluate its usefulness in terms of writing their two assignments in the third stage. However, from an action research perspective, this third stage failed as no students volunteered to be research participants and discuss their use of the resource. Nevertheless, data was generated from the academic stakeholders as the course coordinator and lecturer marked the assignments and monitored the course online discussion forum. They discerned no improvements to assignment quality.

An analysis using their insights revealed that the key contradiction was that despite the online resource having been provided, the students appeared not to have used it. The activity systems were then analysed: the *Design* activity and the *Use* activity. The analysis of the Design activity system resulted in an activity theory diagram revealing to four central contradictions in the activity of designing the online assignment writing resource (see Figure 2). A contradiction, a failure in achieving the intention, is depicted with a zigzag line.

5.1. Contradiction 1: Unchanged mode of resources for face-to-face on-campus workshop and online off-shore resource

Like others who initially work online, the resources used in face-to-face workshops were "migrated" to the online mode (Hewett et al., 2011). The online resource was not significantly different from the resources employed in the face-to-face delivery of the teaching. The resources had been effective in the face-to-face mode, but did not seem to be used nor work for the online mode.
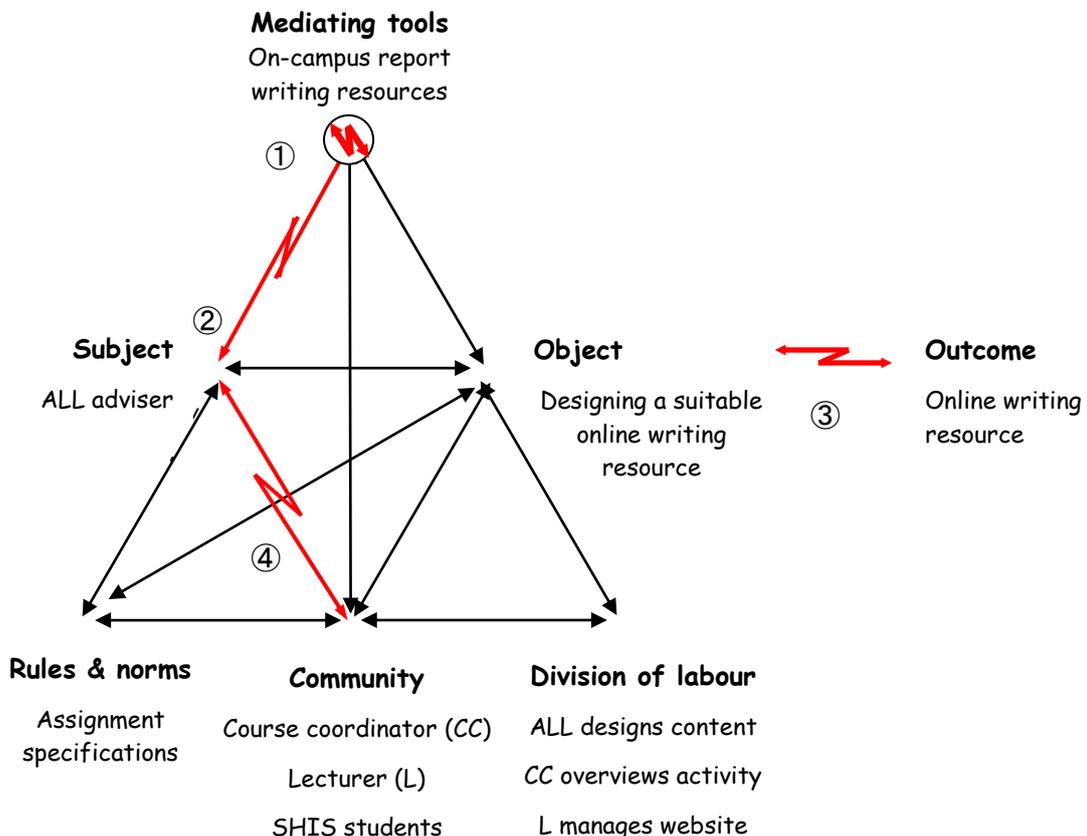

Figure 2. Contradictions in the *Design* activity system for action research cycle 1.

5.2. Contradiction 2: Individual design process versus collaborative design process

In reality, the resources were designed in consultation, but not in collaboration as intended due to time pressures. However, a complication was that the designer of the resource had next to no first-hand experience nor understanding of the transnational computing students in Hong Kong, yet these students were the central subject of the activity system. The assumption was that these students were identical to the on-campus students.

5.3. Contradiction 3: Peripheral or marginalised online resource versus resource integrated in course home page

The aim was to embed the online writing instruction within the course homepage, but in reality was resource was added to existing resources thereby making it peripheral or marginal to the course resources. The resource was not integrated and embedded as intended.

5.4. Contradiction 4: No increased knowledge of students versus increased knowledge of the students

The designer had not understood that these transnational students worked full-time and consequently as they were time-poor needed a concise resource that targeted the assignment criteria. As no students volunteered as research participants, few insights could be garnered about them.

Nevertheless, the *Use* activity system of the student oriented activity system of writing the assignments using the online writing resource was analysed based on insights from the academic stakeholders. Two key contradictions emerged (see Figure 3).
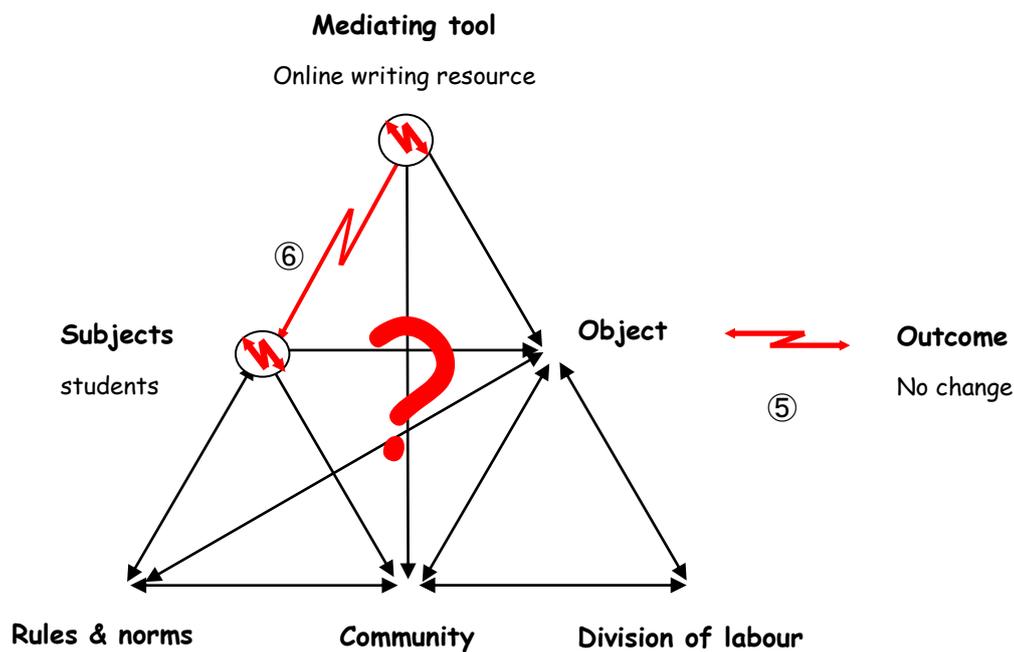

Figure 3. Contradictions in the *Use* activity system for action research cycle 1.

5.5. Contradiction 5: No change in the quality of the students' assignment outcome versus improved assignment quality

5.6. Contradiction 6: No use of the resource versus use of the resource

Apart from no discernible improvement to the assignment quality, another indicator that the students did not use the resource was that they were asking questions on the course online forum to which answers were incorporated in the resource.

Collectively, these contradictions led the design team to question the usefulness of the online resource. In the words of activity theorists, the team questioned what was produced as a mediating artefact and why it was not used. This discussion led to a reinterpretation and reconstruction of the artefact from a wider perspective. The artefact needed to be changed, and in the process the team changed their working relationship to develop new forms of cooperation (Virkkunen & Kuutti, 2000). As a result of this extensive discussion, the team recommended three changes and thereby transformed the activity system:

1. Recommendation 1: that the online writing resource be integrated seamlessly into the course home page.
2. Recommendation 2: that the content of the online resource be linked to the marking criteria.
3. Recommendation 3: that the online resource be simplified in both presentation and content.

Subsequently, in preparation for action research cycle 2, the team developed one folder for all assessment information and then redeveloped the writing resource so it addressed each marking criteria for the two course assignments. This changed form of the mediating artefact proved to be simpler, central, more focused and accessible. Once students perceived the potential of the online resource, they found it useful in clarifying assignment expectations, which resulted in improved assignment outcomes.

In terms of activity theory analysis, the team considered the action research cycle as a networked activity system linking both the *Design* and *Use* activity systems (see Figure 4). Despite the paucity of student data, the emergent contradictions resulted in the need to change the conceptualisation of the online writing resource. Foremost though was the urgent need to gain a deeper insight into the students who were writing the assignments and potentially using the resource.
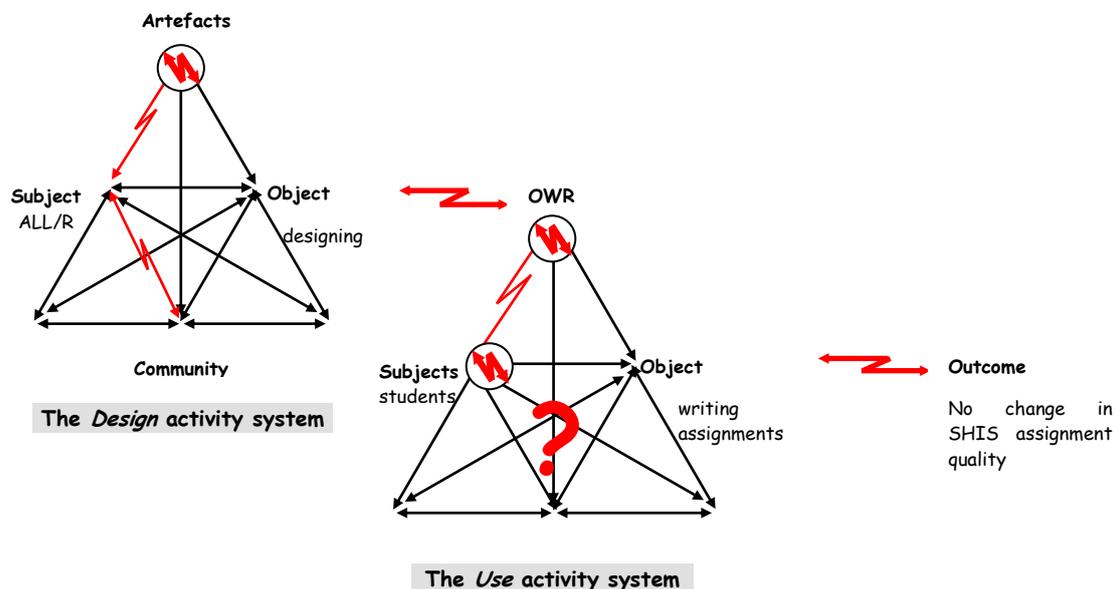

Figure 4. The networked *Design* and *Use* activity systems for action research cycle 1.

6. Discussion

This paper has provided an example of how Engeström's third generation of activity theory in conjunction with action research can provide deeper insights into the actual experiences of students and academics in relation to using online academic writing resources embedded within a course. These insights are not just about the students and their use/non-use of the resource but also about how this use is related to the linked activity system of designing the resource.

Furthermore, the activity theory analysis provided a detailed perspective on the interaction between system components which were contradictory, namely where the intention and the action did not match. This analysis provided a nuanced interpretation of the non-use of the intended mediating artefact. This central contradiction led to identification of further contradictions. The ongoing conversations between the design team addressed these contradictions, particularly regarding the students and the artefact itself. The academic stakeholders changed their perceptions of the activity system and consequently the activity system itself was changed. This zooming in and out, enabled the team to ascertain the networked nature of the two activity systems and improve their understandings of the transnational teaching and learning context and the students' failure to use the mediating tool intended to improve assignment writing. Without the ensuing detailed consideration of the linked and networked *Design* and *Use* activity systems, the overall analysis would have considered this first action research cycle as a failure. Activity theory as an analytical tool provided a systematic framework to consider a broader set of sociocultural influences affecting the networked activity systems, namely designing online academic literacies resources embedded within a computing course for EAL students and students using these resources for improving the quality of their written assignments.

Of interest from a theoretical perspective is how action research by itself did not provide a tool which could adequately interrogate the data. This first action research cycle could have been dismissed as a failure or 'pilot study'. However, the dialogue between the course team and the ALL adviser/researcher effected change with the subsequent action research cycles generating substantial student data. Using action research alone to analyse the data from the next action research cycles, despite providing a 'rich' description, would not have adequately reflected the multi-layered complexities of the *Design* and *Use* activity systems. The students provided data which was beyond their experience of assignment writing and using the online resource; they provided an insight into the sociocultural context from which to reflect on their experiences. The use of activity theory enabled the researcher to capture that data, always reflecting on: What are the contradictions? What has changed (transformed) and why? What mediated this changed behaviour and why? The use of activity theory illustrated, illuminated and deepened the conceptual understanding of what occurred over the three action research cycles.

The use of activity theory has great potential and could be used in a variety of ways by ALL practitioners. In terms of academic practice for ALL academics and professionals, activity theory can provide a deeper analysis of change of behaviour within groups of individuals as they engage in academic activities. Third generation activity theory enables researchers and academics to look beyond cognitive behaviours to a plethora of sociocultural factors or influences within specific educational contexts.

Acknowledgements

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