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PROPOSING THE THIRD GENERATION OF AN ALIGNED ACTIVITY SYSTEM AS A THEORETICAL FRAMEWORK IN BLENDED LEARNING RESEARCH

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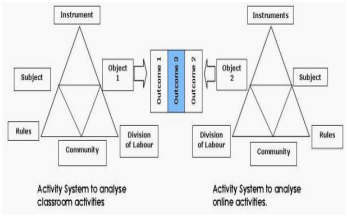
Graphical abstract



Abstract

Many international researchers across various disciplines have adopted the use of activity theory in interactive digital media research, namely blended learning research. Activity theory has been widely applied into various educational fields such as understanding language, learning mathematics, and developing systems of Computer-Supported Collaborative Learning (CSCL) features. Researchers should consider using the third generation of activity system to develop a theoretical framework for the study of blended learning as it could provide important insights into both online and classroom activities. This paper suggests the development of a theoretical framework for blended learning research by integrating the third generation of activity system (Engeström, 1999), the concept of sub-triangles within each activity system (Jenlink, 2001) and the concept of constructive alignment (Biggs, 1999).

Keywords: Activity theory, blended learning, constructive alignment

1.0 INTRODUCTION

Various methods on using interactive digital media for learning in institutions of higher learning have been developed. These include the use of e-learning that engaging learners to become actively involved in learning and leading teachers to be more proficient in their teachings skills. Conole, *et al.* (2004) urge online learning researchers to look at their studies in a broader and holistic scope of the socio-cultural framework. The current emergence of blended learning in many tertiary institutions appears to have coincided with a growing awareness of the existence of Cultural-Historical Activity Theory. The theory was founded on a sociocultural perspective of human development [10], [15], [16], [17]. According to Nardi (1996), activity theory is increasingly popular in the study of Human-Computer-Interaction (HCI). It is an appropriate framework to understand and to describe the learning experience of students and teachers in a learning setting that using technology. Activity theory also provides a broad view of the system in which activity and learning are taking place. Activity theory is used mainly to understand the design of computer information system and design of Computer-Supported-Collaborative Learning (CSCL), and it has also been applied to understanding learning within team work [11]. According to Sandars (2005), activity theory is a concept and a theoretical perspective that has been referred to by many researchers across disciplines as a framework to explain and interpret various online learning research. Thus, in establishing the framework based on activity theory, it is important to understand the theory.

2.0 A BRIEF HISTORY OF ACTIVITY THEORY

Activity theory is known as cultural-historical activity theory. It was originally developed based on Vygotsky's

social constructivist theory of learning. Starting with the premise that activities occur within a context, it is important to 'make meaning of the situation and appropriate interpretation of the results' (p. 92) [4]. Thus, constructivist learning environments stressed the development of long-term understanding through meaningful contexts and interactions that reflected how knowledge was developed and used in the real world. According to Kaptelinin, *et al.* (1999), many educational researchers began to look into the use of activity theory. Engeström (2001) describes activity theory as a framework that has evolved through three generations of research.

2.1 The First Generation

The historical background of an activity theory started in Russia. After the Russian revolution in 1917, there was a need to develop a new field of psychology based on the philosophy of Marxist. In the 1920's and 1930's several conceptualisations were proposed. One particular group of Soviet psychologists proposed a concept called 'principle of unity and inseparability of consciousness and activity' [1]. Kaptelinin *et al.* (1999) describe the principle as understanding human mind through their interaction with the world and this interaction is 'socially and culturally determined'. This principle was further developed by Lev Vygotsky who introduced the mediational model (Figure 1). Based on a concept of a relationship between stimulus and responses in psychology, Vygotsky (1978) describes the interaction between human and their environment as not direct. Instead, it is mediated by artefacts (signs and tools). However, the analysis of the interaction between human and their environment is limited to the focus of an individual.

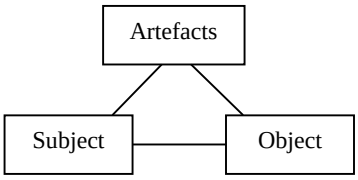


Figure 1 The mediational model (Vygotsky, 1978)

2.2 The Second Generation

The limitation of an activity theory in the first generation was overcome by the second generation based on Leont'ev's work (1978). Leont'ev (1978) further developed Vygotsky's ideas of social and cultural mediation by adding the concept of human activities. Based on Leont'ev's concept of human activities, Engeström (1987) modified the mediational model and introduced an expanded version called activity theory. This activity theory is widely used as a framework or tool to describe system in an organisation and is also known as an activity system. Engeström (1999) further emphasises that the focus of the study of mediation should involve other components within an activity system.

The Activity System

The extended Activity System developed by Engeström (1987) consists of seven main components – subject, instruments, object, community, rules, division of labour and outcome. The system is used to understand the organisation, describe the activities taking place, and focus on the evaluation on specific issues (Figure 2).

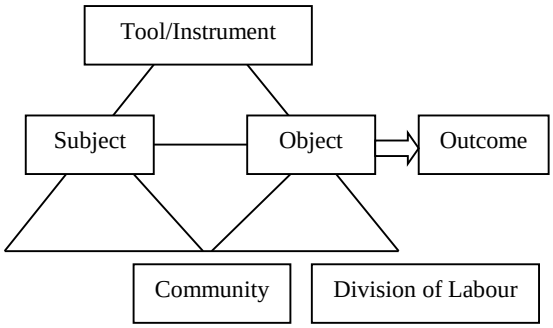


Figure 2 An activity system (Engestrom, 1987)

Based on this activity system, Engeström (1987) explains three inter-related connections between the element of the subject, the object and the community. The relationship between the subject and object is mediated by tools, while the relationship between subject and community is mediated by rules. The relationship between the object and the community is mediated by the division of labour. The tool is used in the transformation process. The rules are referred to as explicit and implicit social norms, behavioural conventions and accepted social values within a community. The explicit and implicit organisation of labour within community is described by the element of the division of labour. This is related to the transformation process of the object into the outcome. Eventually, the influence of the division of labour will transform the object to become intended outcomes.

2.3 The Third Generation

In relation to Leont'ev's conceptions of an activity theory of the second generation, Engeström (1999) agrees that the tools or artefacts which are used by human as mediation to interact with the environment within an activity system. However, the study of mediation could be extended to other components from another activity system. According to Engeström (1999), two activity systems could be joined together as the unit for analysis and this forms the basis for the third generation of activity theory. Based on Engeström's analysis, Uden, *et al.* (2008) further explain that the structure of the social world is experiencing the process of social transformation through the conflicts in the social practice. These conflicts are referred to the instability and contradictions which act as the motive

force of change and development. This would lead to the reorganisation within and between activity systems and is considered as parts of the evolution. Thus, the aim of the third generation of activity theory is to understand various different dialogues and perspectives in the interacting activity systems.

Analysing Blended Learning using the Third Generation of Activity System

Through the use of Virtual Learning Environment (VLE), many tertiary institutions have combined online learning with classroom learning. In analysing both learning with the perspective of activity system, the main challenge raised is the complexity of the learning activities which involves both the technology and the traditional classroom setting. Therefore, the third generation of activity system as proposed by Engestrom (1999) is able to provide explanations to unravel the complexity. As the third generation of activity system incorporates two or more interacting activity systems, each activity system will represent each type of learning (Figure 3). The first Activity System represents the face-to-face activities system while the second Activity System represents the online activities. The system emphasises the relationship between interactions among the students and the tutor, the processes of the collaboration through activities and the outcomes from the collaboration efforts.thrilling elements.

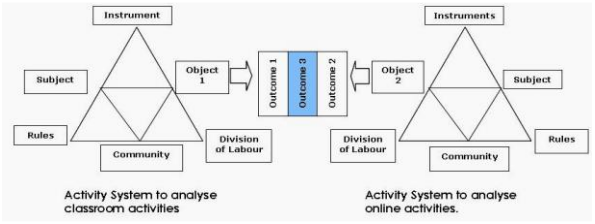


Figure 3 The third generation activity system-adapted from Engestrom (1999)

The following section describes the use of the third generation of activity system to analyse the blended learning within a general academic module in a tertiary institution from a wider and theoretical perspective. The module is analysed based on using the elements of subject, object, rules, division of labour, instrument, community and outcome within an Activity System (Figure 4) is analysed.

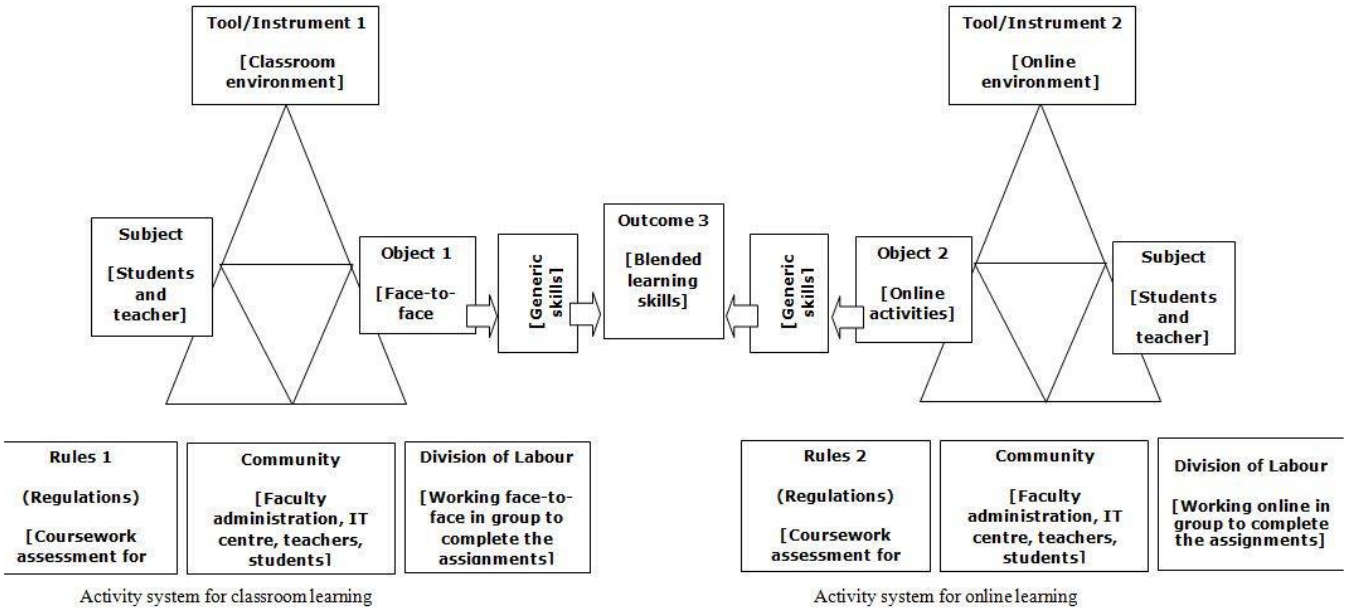


Figure 4 The third generation activity system-adapted from Engestrom (1999)

Subjects: The subjects are participants involved in the process of blended learning and they are the students and the teacher.

Rules: The important regulation is that all students had to work within the VLE and they have to work in group in completing the assignments. All the students are assessed by teachers. However, the VLE and the group work are allowed to be conducted with different approaches. At the University level, all academic staffs are required to utilise the VLE for their online subjects. The IT Centre keep track of the staffs who do not utilise the system.

Division of Labour: The students are required to engage in team work. They have to work collectively

and collaboratively in completing their group assignments. The division of works are shared among group members and they contribute to the online forum discussions.

Instruments: As the class is conducted in a blended setting, there are two components of teachings involved. First, the classroom learning where students attend the face-to-face weekly 2 hours lecture in the classroom. Second, the teacher and the students use the VLE in their teaching and learning process.

Instrument 1: During the face-to-face classroom meeting, the teacher delivers the subject content to students, attends to students' inquiries on the subject content and assignments, and reminds students to participate in the compulsory online forum discussions.

Instrument 2: In the online environment, module is made available through the VLE. All matters pertaining to the subject such as announcements about cancellation of classes, dates and venues for substitute classes, changing of assignments deadlines and the venue for mid-term exam, which are not mentioned in class, could be made available online and students are expected to access there.

Community: The community is the participants who are directly involved in the online learning in a broader context.

Object: The objects are the group projects/assignments and online activities that were designed by the teachers. These project assignments are completed through a blend of face-to-face and online activity.

Object 1: These parts of the assignments are completed through face-to-face activities.

Object 2: These parts of the assignments are completed through online activities.

Outcome: Two important skills are expected to be acquired by the students at the end of the semester. First, basic subject skills using the authoring language software so that they could develop a simple educational prototype, and second, most importantly the generic skills acquired by the student through working in a group that lead to developing and sharing the knowledge.

Outcome 1: Team working for face-to-face activities

Outcome 2: Team working for online activities

The combination of team working skills from both interacting activity systems yields outcome 3.

Outcome 3: Acquisition of blended learning skills in completing the assignments.

3.0 DERIVING THE CONTRADICTION

Activity theory illuminates three important aspects that exist in learning organisation. These are contradictions, changes and outcomes (Engeström, 1999). Contradictions are referred to the learning activities conducted online and face-to-face. Contradictions are central to the discussion in viewing the different perspective of students' working in classroom and online. When a group is not working well in one semester, a teacher will assess the situation and devise a plan of action in the next class. These are the changes or interventions that the teacher is making in the hope of improving the teaching and learning experience, for example that will yield positive outcomes. By observing, comparing and analysing both online and classroom learning activities, some contradictions can be derived and categorised. However, deriving these contradictions does not mean we are widening the gap between the classroom and online learning. Instead, we are looking for potential instructions to combine both classroom and online mode. In order to combine both modes, a concept of constructive alignment (Biggs, 1999) is introduced.

3.1 Constructive Alignment

The term constructive alignment is derived from Biggs (1999) who defines it as a good teaching system that 'aligns teaching method and assessment to the learning activities stated in the objectives, so that all aspects of this system are in accord in supporting appropriate student learning' (p.11). The main objective of a blended learning course is to enable students working in a blended mode. They should successfully construct knowledge through interactions in classroom and online activities and this is the intended learning outcomes. Thus, the constructive aspect refers to students learning which is to construct meaning through online and classroom activities. In order to know whether the students have achieved the learning outcomes, it is important to measure their learning through appropriate assessment such as peer evaluation (team working) and evaluation on their online and face-to-face activities (working in a blended mode). There are two types of alignments. The first alignment as suggested by Biggs (1999) refers to the teaching method used which is to support the blended learning activities and to achieve the indented learning outcomes. From the third generation of activity theory, one activity system represents the classroom learning while the other represents online learning. As classroom activities should complement online activities, the second alignment is used to align the two interacting activity systems. Thus, constructive alignment becomes an integral part of forming the theoretical framework.

3.2 Activity Theory and Sub-Triangles

According to Jenlink (2001), activity theory is based on "a relational dynamic between the subject, object, mediational artefacts (or tools) sociocultural rules, division of labour, and community of structure of a human activity system" (Jenlink, 2001, p. 348). Jenlink (2001) who is the educational theorist who emphasises the importance of human activity systems, further adds that each triangle of activity system should consist of three sub-triangles (Figure 5). The three sub-triangles are connected with each other to form a framework for analysing and designing human activity systems such as educational systems. (Jenlink, 2001).

Today, the development of activity theory as a framework is to understand activity in a human system which focuses mainly on the interaction among and between people. Jenlink (2001) adds that activity systems are "complex interrelated sets of actions and activities or practices, situated within socio-historical and socio-cultural contexts" (p. 348).

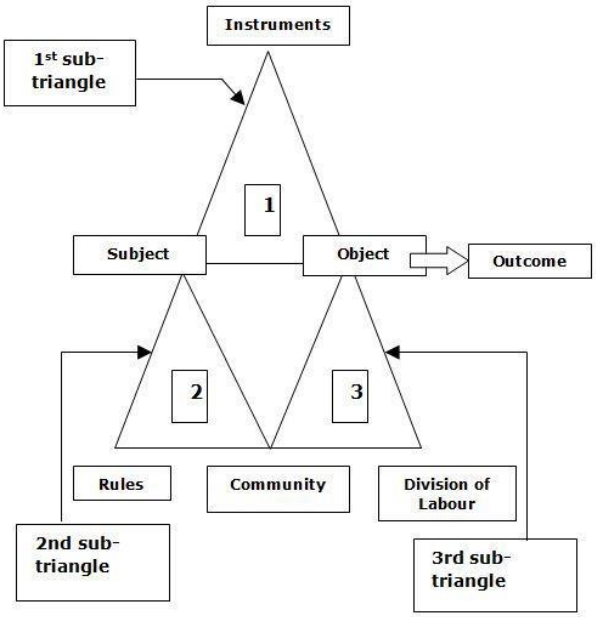


Figure 5 An activity system that consists of three sub-triangles within a single triangle as formed by Jenlink (2001)

Jenlink (2001) provides the following explanation on how the sub-triangles work. The first sub-triangle features the relationship between the subject, instruments and the object. The subject is referred to as a person who is associated with the activity created by the organisation. The second sub-triangle shows an interrelated element of the activity system. This element depicts the relationship between the subject(s), the socio-cultural rules of the community (related to the object, goal, and outcome) and the designated community made apparent. The third sub-triangle portrays the relationship between the object(s) or intentioned outcomes(s), the community that the subject is involved, and the division of labour that related to the particular activity. The contradiction categories derived from the activity system of the third generation can be assigned into these three sub-triangles.

4.0 PROPOSING THE THIRD GENERATION OF AN ALIGNED ACTIVITY SYSTEM

There are three significant elements that needed to be integrated. They are the activity system of the third generation that is used to derive the contradiction categories from working in blended mode, the three sub-triangles within an activity theory introduced by Jenlink (2001) and the concept of the constructive alignment (Biggs, 1999). Referring to the third generation of activity theory, the first three sub-triangles represent the classroom learning while the second three sub-triangles represent online learning. The concept of constructive alignment is used to align both classroom activities and online activities so that the three sub-triangles which represent the classroom learning are made interacting with another three sub-triangles that illustrate the online learning. In other words, the concept of constructive alignment is used to construct the online activities and classroom activities to complement each other and consistent with the objective of the module. Both activities are also intended to achieve the same learning outcomes. This new concept of activity alignment is termed as the Third Generation of an Aligned Activity System (Figure 6).

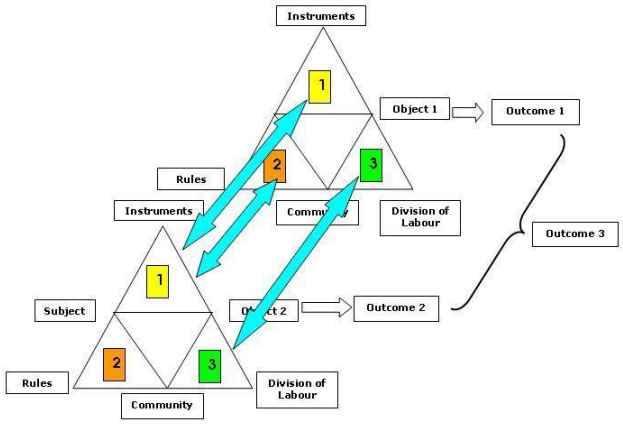


Figure 6 The formation of the third generation of an aligned activity system

5.0 CONCLUSION

The third generation of activity system can be used to derive contradiction categories from working both online and classroom learning while the constructive alignment concept is used to align both face-to-face and online activities. This serves as the underpinning theoretical framework for blended learning research.

6.0 FUTURE WORK

Blended learning promises a mode of personalised and student-centred learning. Some practices have emerged among the diverse blended mode. As interest in blended learning research remains high, more educators continuously changing and experimenting various methods to find the perfect balance of face-to-face and online mode to meet the needs of the students. More future research is needed to determine the effectiveness in delivering

the content through blended mode, including the integration of the proposed theoretical framework of the third generation of an aligned activity system.

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