

African American Students' Motives and Goals in AP Science

An Activity Theory Analysis of African American Students' Motives and Goals for Participating in Advanced Placement Science

African American students have been systematically discouraged from taking advanced courses in science and math (Klopfenstein, 2004). In addition, low AP exam passing rate among African American students raised further concern whether accessibility alone adequately addresses the issue of inequality (Sadler & Tai, 2007). However, little research has been conducted to understand African American students' learning process in AP science courses. The purpose of this research is two-fold. First, we intend to gain deeper understandings of African American students' motivational orientations for participating in AP science and how they align their personal motives and goals with meaningful practices within the AP learning context. Second, we offer an opportunity for science educators to re-conceptualize AP science learning from an activity theory (AT) perspective (Engestr m, 1999). Three research questions guided this study: (a) what motives informed African American students' participation in AP biology? (b) How did these motives evolve and develop during an AP biology course? (c) What elements facilitated or hindered goal realization?

Theoretical Framework

Recent research in science learning has shifted focus from a purely psychometric approach to analyzing educational practices as social and cultural phenomena (Arnseth, 2008). AT is a cross-disciplinary framework originated from Vygotsky's sociocultural theory (Kim, 2011). Vygotsky (1978) formulated the classical triangular model, in which he proposed the important concept of mediation. In particular, the *Subject* is the individual engaged in the mediated action. The *Object* refers to the objective of the activity. The mediating *Artifacts* include physical, cognitive, and psychological tools. Engestr m (1999) expanded Vygotsky's tool mediation to include collective mediation. The *Community* refers to those with whom the subject shares the same general objective. The *Division of Labor* is the classification of tasks among the members of the community, while *Rules* are regulations and norms that govern actions of the individual and group. AT provides a useful lens for analyzing a learning context such as AP. First, the theory emphasizes not only the study of the context per se but also the effects of human agency, that is, how participants perceive the context and utilize the resources in the context. Furthermore, the theory offers a coherent explanation of a learning process by allowing simultaneous considerations at individual and social levels (Kim, 2011). Finally, the internal conflicts and contradictions among the elements in an activity system also provide an opportunity for expansive learning and a momentum for change (Engestr m, 1999).

Method

The primary site of this study was a rural public high school located in the southeast United States. Ongoing data collection is also occurring in additional AP science classrooms at a suburban and a private high school. The main form of data collection was a series of in-depth, one-to-one interviews (about 1.5 hours each) spread over a semester. In addition, AP classroom observational data will be collected to substantiate the interviews. The preliminary results reported below were based on the retrospective interviews of three African American students at the end of spring 2014.

Themes and patterns were first identified using the process of open coding (Strauss & Corbin, 1990). After initial, unrelated coding categories are established, the constant comparative

method (Miles & Huberman, 1994) was used to establish theoretical relationships among the initial categories. Peer debriefing, disconfirming cases, and member check were qualitative techniques used to enhance the credibility of data analysis.

Preliminary Results and Discussions

This study confirmed that the alignment of motives and goals with coping strategies within the AP learning context is crucial to the realization of goals (Kim, 2011). The three African American students match the description of the “other smart students” in Aikenhead and Jegede (1999) who play what’s called the “Fatima’s Rule.” Although they were motivated to go to college and hard-working, their effort was targeted at the instrumental motive of passing the exam or achieving good grades, mostly through mechanical learning. The outcome of the course could be described as “compromised realization of goals,” as the three African American students modified their original goals to make compromises with the reality in their learning environment.

In addition, the necessity to cover a large amount of information superficially seems to be in conflict with inquiry-based learning advocated in the science literature. There is a need for not only restructuring the AP science curriculum but also incorporating the explicit teaching of cognitive learning skills and strategies into the AP course work.

Second, school personnel must better utilize AP minority students and their family members as resources to include and attract a wider population of African American students. AP science may be viewed as a venue for forming new friendships with a more diverse group of students rather than a place that alienates African American students from their cultural peers.

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