Chapter 39
Learning Biology With Situated Learning in Mexican Zapoteca Tele-Secondary Schools

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ABSTRACT

Biology and Environmental education are increasingly important disciplines to be taught in rural settings, where indigenous communities frequently hold ownership of invaluable natural resources. However, the Mexican science curriculum does not cater for the specific educational needs of the country's numerous ethnic groups. Situated learning is a pedagogical alternative that affords the possibility of integrating the pupils' culture and ways of interpreting the world within the curricular aims. Nevertheless, there are no reports of its usage in indigenous schools. This paper analyses two 90-minute classes as examples of how situated learning can be used to introduce the concepts of biodiversity and ecosystems in indigenous Zapoteca tele-secondary science classes. The results suggest that using situated learning for these topics helped students understand the concepts, see the importance of what they were learning, and motivated them to learn further.

INTRODUCTION

Think about the time when you learned how to draw a graph. You probably learned this skill when you were in Math class, and practiced it endlessly during your education with random numbers given to you by your teachers and textbooks. However, when you got to your first science practical and had to draw a graph with the data you had just obtained you were nonplussed and it took you a long time to figure out how to do it (Georghiades, 2000). That is because learning does not take place inside a vacuum. Instead, it takes place within a specific context, and if that context is the Mathematics classroom, then it is very hard to transfer it to a new and unfamiliar setting. Now imagine that you were taught how to graph by

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actually going outside and measuring things, or by asking questions to people around you, figuring how to better present their answers, and then discussing your results with a group of your peers. Working with real data, you might be better placed to understand the relevance and real-world applications of what you were doing, and you would have had the opportunity to discuss tasks with your peers. This simple example attempts to exemplify how a theory called "situated learning" proposes to teach: using authentic learning situations rooted in students' social and cultural contexts.

In more academic terms, situated learning (Lave, 1991; Lave & Wenger, 1991) is a sociocultural educational paradigm that states that learning must be seen as a multidimensional process of cultural appropriation that involves thought, affect and action (Baquero, 2002). It is a context-based approach for teaching and learning that instead of focusing on isolated learners, considers them as groups that operate within a given context. This is significantly different to other concepts of learning which focus on changes that happen inside individual learners' minds. Situated learning views the students as a part of a peer group and a wider social and cultural context that have shaped their views, identities, attitudes, and ideas. It conceptualizes learning as much more than the mere acquisition of knowledge or changing of concepts within a person's mind. Instead, learning is seen as a process in which a novice will appropriate the cultural background of the society around her and thus become a more active or expert member of the group, will participate more actively in her community of practice, and will be able to transfer her learning to new situations. Since learning is something that occurs within a sociocultural group, it cannot take place when it is irrelevant or disconnected to a person's context. Therefore, situated learning promotes the use of culturally-relevant, authentic, and meaningful activities to achieve learning.

By saying that learning involves thought, affect, and action, situated learning rejects the notion that an individual can just change her ideas without changing anything else in her identity (Handley, Sturdy, Fincham, & Clark, 2006). Learning is more than memory: besides thought, it involves a whole set of attitudes and feelings towards what is being learned, a series of actions done both to learn and having learnt something, and a series of changes that happen in each individual as a result of that learning. According to situated learning, students are more than their minds, and include a complex set of motivations, aspirations, attitudes, dreams, culture, customs, cultural and socioeconomic backgrounds, and ideas about the world. Each one of the students and groups of students will be different, and learning should be relevant for everyone.

While a situated learning approach would require activities in each geographical area to be catered towards the needs of local students, the reality in Mexico is different. There is one national curriculum and one national textbook for each subject (Secretaría de Educación Pública (SEP), 2015), and until recently, there was a national exam that tested every single learner in the country in the same way (Poy Solano, 2015) regardless of their cultural background (Ruiz, 2012). Rather than regionalizing education, the federal government recently closed the regional educational authority in the state of Oaxaca (Aristegui, 2015), a move that some see as an attempt to further centralize education (Lizárraga Bernal, 2015). Considering that Oaxaca[1] is one of the most culturally diverse states in Mexico, and one with the highest proportion of indigenous inhabitants (Instituto Nacional de Estadística y Geografía (INEGI), 2010), it is surprising to see that the diversity in the student body is not reflected in the learning situations used to teach them. The uniformity of the curriculum, multimedia materials, textbooks, and pedagogical recommendations for teachers constitute a one-size-fits-all solution for a very diverse state and an even more diverse country.

Indigenous schools in Mexico have the lowest educational achievement national rankings, and their students are widely discriminated and excluded from numerous educational opportunities (Bonfil,