

## Chapter 6

# Barriers to Adopting Technology for Teaching and Learning

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### **ABSTRACT**

*The purpose of this chapter is to use a cross-cultural research-based evidence to discuss the root causes of barriers to effective technology adoption by evaluating the effect the teaching environment and the ranges of teacher behaviors have on technology adoption. The author described and explained the change processes that teachers go through as they implement new technologies or instructional practices with a view to connecting the change process, the innovation, and the individuals involved in the process. Two overarching frameworks that guided the author's discussion of this chapter and the behavior engineering model (BEM) and the concerns-based model (CBAM) frameworks.*

### **INTRODUCTION**

There is little disagreement among scholars that technology has opened up numerous innovative possibilities for delivering information and providing platforms for effective communication (Nwulu, E., 2018). For teachers, however, the extension of the gains of computer-mediated learning systems to enhance teaching and learning is moderated by human and non-human interactions prevalent in the educational system as currently constituted. Progressive governments and stakeholders in education continue to provide educational technology affordances such as Internet, computers, smart boards and other devices in the attempt to enhance the teaching and learning process. However, in the absence of a tested technology integration framework(s) that models how teachers' attitudes and concerns inform technology use in their classrooms, such investments fail to maximize the intended returns. Teaching and learning does not happen in a vacuum. There are multiple opinions, and practices in the teaching and learning space. Some perceive teaching and learning as a veritable public good that empowers citizens

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to social mobility and accountability vital to orderly roles in society (Nwulu, E., 2018). Others argue that teaching and learning is a life-long individual responsibility necessary for survival in an ever-emerging complex existence (Nwulu, E., 2018). Behind each notion of the purpose of teaching and learning strides a guiding philosophy, a mission or vision that infuses all facets of the teaching and learning system.

The deliberate integration of technology into teaching and learning has come full circle in the 21<sup>st</sup> century with potential to enhance and fast track the learning and teaching trajectory. Teaching and learning has a symbiotic relationship with technology in both historical and emerging contexts that continue to thrive. From teaching machines to the programmed instruction model that began about the 1960's which morphed unto mainframes in the 1970s, and PC's in the 1980's, technology continues to innovate ways to simplify otherwise, complex concepts in education. The introduction of the Internet became vital in the development of many other instructional models driven by two intense and opposite philosophies: Behaviorism and Cognitivist that include other models tucked safely within the continuum.

### **Cognitivist Worldview**

Unlike the behaviorist's worldview, cognitivists are concerned more about the relationship between the learner and the environment because Cognitivists promote that learners acquire knowledge and construct meanings through their individual interactions and experiences in the course of living. To the Cognitivist, learning happens as each learner actively participates in the activities they are involved in. According to Cognitivists, the most efficient way for learners to construct new knowledge is through "assimilation" and "accommodation," as they engage in active knowledge discovery (Piaget, 1954; 1981).

Learning skills classified in four separate domains applicable to the cognitivist worldview suggested for the 21<sup>st</sup> century learners' include the following:

- The 3Rs (Reading, 'riting and 'arithmetic) as the foundation for education
- Learning and innovations skills that require critical thinking and problem solving
- Life skills such as collaboration, teamwork and leadership
- Digital literacy skills such as computer literacy and digital fluency

Though computers and digital technologies are crucial in the application of the above skills, the 21<sup>st</sup> Century emphasis is on the ability of learners to exercise critical thinking, and a high level of problem solving using technology (Trilling & Fadel, 2009).

For educators to facilitate teaching and learning in the 21<sup>st</sup> century, the expert teacher, though familiar with classroom curricular design, effective instructional strategies, and the "withitness" of classroom management techniques, must now infuse a proven technology integration framework to his or her repertoire to effectively integrate technology into the 21<sup>st</sup> century classroom. The Technological Pedagogical Content Knowledge (TPACK) Framework is highly favored by educators for workable strategies for technology integration. Technological pedagogical content knowledge (TPACK) is a framework that explains the complexities of technology integration. According to the framework, technology integration occurs at the intersection of sufficient representation of concepts across knowledge bases in technology, pedagogy and subject matter content. The TPACK framework accounts for contextual technology integration in teaching and learning. The original concept credited to Shulman (1986), introduced pedagogical content knowledge (PCK) into the adoption lexicon in response to the isolation of subject knowledge and pedagogy in disparate research domains by teachers - a practice Shulman (1986) insisted, failed to give

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