Technology Integration in Implementing a Curriculum: Teachers’ Beliefs and Willingness to Change

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Abstract. Teachers’ roles in implementing a curriculum is crucial in ensuring the planned curriculum is able to achieve its intended meaning. Accordingly, technology integration is considered essential as it perpetuates better learning outcomes for the learners. Specifically, embracing a new curriculum at classroom level requires teachers as its sole enactors to integrate any technology which accompanies an innovation. However, technology advancement does not confirm comprehensive integration. Subsequently, this conceptual paper tries to elucidate teachers’ willingness to change and beliefs as predictors to successful curriculum implementation where technology integration is involved. Findings indicate that these two constructs are able to manoeuvre teachers to implement a new curriculum in a successful manner when technology integration is involved.

Keywords: curriculum implementation, teachers’ beliefs, teachers’ change, technology integration

1. Introduction

Curriculum always undergoes changes in accommodating any education reform. Existing curriculum is revised, revoked, and substituted with a more sophisticated curriculum which adheres to the current state of a country’s political, economy and social demands. Apart from that, globalisation plays an equally important role in determining the formation of a national curriculum. The UNESCO Sustainable Development Goal 4 (SDG4) has outlined that curriculum should articulate lifelong learning and competencies required for holistic development [1]. However, literatures have shown that curriculum implementation failures are common across the globe [2]–[4].

This paper views that in order to perpetuate successful implementation of the planned curriculum where technology integration is implied, teachers must be willing to change in ensuring the actual use of a curriculum innovation occurs. Subsequently, curriculum implementation transpires when certain new characteristics come into actual practice [5]. Technology integration for example, is a regular feature of innovation. Simultaneously, the integration of technology requires different types and levels of change which include introduction of new teaching approaches and materials [6]. Meanwhile,
technology innovations itself can be categorised into well-structured innovations and poorly structured innovations [6].

However, the willingness to change must be derived from a concrete belief that something or somebody must adorn the change. Subsequently, it is the humans’ beliefs which command and steer their actions. Given that the decision whether to integrate a technology or not when implementing a curriculum gives tremendous impact on students’ motivation and engagement, it is conceivable that the lack of constructive utilization of any software tool prescribed together with a curriculum may deter its vast potential to support students’ learning [7]. This situation can be made worse if any tool intended to enhance the learning outcome defies its intended purpose. For example, the presence of unused laptop or desktop in any classroom can be obtrusive if it remains unused [7]. This proves that sophisticated technology is in vain in the absence of teachers’ beliefs in its utilisation or lack of desire to learn on how to utilise it.

Therefore, together with the willingness to change, it is the teachers’ beliefs which determine whether successful curriculum implementation can be materialised or not. Subsequently, there are two types of barriers capable of hindering the integration of technology. They are identified as “first-order barriers” and “second-order barriers”. The “first order-barriers” are constituted of "extrinsic factors” like restricted or difficult access to technology and insufficient support from the school administration, while the “second-order barriers” are encompassed of intrinsic factors which include teachers' beliefs [8]. Therefore, this conceptual paper intends to highlight teachers’ beliefs and willingness to change as two constructs predicting successful curriculum implementation when technology integration is involved.

2. Teachers’ Beliefs and Technology Integration

Belief is a powerful notion to describe an attribute we hold dearly to our core. Subsequently, teachers practice what they believe. Teachers’ beliefs reflect a set of conceptions held with personal conviction, considered true, and provide helpful heuristics for teachers to juggle complex contexts posed by schools and classrooms demands [9]. They describe three facets of teachers’ beliefs identified as the beliefs about knowledge, teaching and students’ abilities. Meanwhile, a teacher’s belief can either determine the success of a curriculum implementation or launch it to defeat. Again, there is a close association between teachers’ beliefs and curriculum change. If teachers believe that the change benefits the students, they will align their attitudes and behaviours to support the prescribed curriculum. However, if change is believed to be burdensome or beyond their realistic reach and target, they will act against it [4], [10]. This is in accordance with [11], who propose that teachers’ beliefs are capable of influencing teachers’ judgements and teaching approach.

The Theory of Reasoned Action [12] postulates that behavioural beliefs are the underpinning influence on an individual’s attitude in performing their behaviour. Meanwhile, salient beliefs or information affect both individual’s intentions and subsequent behaviours can be observed through attitudes and/or through subject norms [13]. Accordingly, when people believe that they do not possess ultimate control over the behaviour they perform due to inadequate vital resources, this will lead to low intention to perform the behaviour. For instance, teachers' beliefs evince the lack of support rendered to high critical thinking activities create a vigour gap between the English language learners and general education students in a study conducted in north eastern United States where the schools enrol high population of students whose first language is Spanish. This resulted in a detrimental effect in which the execution of the less rigorous curriculum is favoured by the teachers for the English language learners, which is not only capable of diminishing their academic performance, but in the future this will lead to more non-rigorous instruction for these students [14].

Therefore, the incorporation of information technology and digitalization are viewed as the perfect vehicle to incorporate more sophisticated critical thinking activities, but again it requires teachers’ beliefs to initiate those changes. Accordingly, technology use and meaningful integration in school require more than technology-related factors. It is a complex process where teachers’ beliefs primarily determine whether to integrate or abandon the proposed technology in their pedagogical approach and content delivery of their lessons. For example, a Malaysian study by [15] has proven that teachers’ reluctance to incorporate the Computer Assisted Language Learning (CALL) is one of the factors identified contributing to the failure of the implementation of Teaching Mathematics and Science
(ETeMS) curriculum. This is consistent with what have been described by [16] who postulate that teachers’ pedagogical beliefs may discourage the integration of technology.

Even though it is generally believed that a lesson infused with technology integration is able to yield student learning and performance. However, it is teachers’ constructive beliefs which prompt them to act as effective curriculum implementers. Therefore, in examining teachers’ current beliefs, practices and barriers to the integration of technology among kindergarten teachers in midwestern United States, [17] found out a strong association between teachers’ beliefs and self-efficacy. For example, teachers who adopt for constructivist pedagogical belief in relation to the use of technology are prominent among those who hold high level of self-efficacy beliefs. This finding directs to the need to understand internal or personal factors which are capable to consolidate a teachers’ self-efficacy and their beliefs in technology integration.

Meanwhile, in embracing IR 4.0, technology and teachers’ beliefs must be aligned to complement each other especially in ensuring successful curriculum implementation under any education reform. Therefore, a perfect marriage must be proposed among these two. Ultimately, it is of vital importance to identify what can bring these two together. For instance, a “multi-dimensional approach” is obligatory in conveying the association between pedagogical beliefs and technology use has been proposed by [16]. They also found out that the relationship between teachers’ pedagogical beliefs and the use of technology should be viewed as bi-directional. They further describe two types of directions which steer teachers’ beliefs; technology as a tool and technology as an opportunity. Thus, identifying teachers’ beliefs to integrate technology has the capacity to initiate better condition for successful curriculum implementation.

Therefore, teachers’ beliefs are not only profound in implementing a curriculum, they are capable of instilling of dilute any advancements brought by any global education movement or technological advancement, whether to be achieved, delayed or resented.

3. Teachers’ Willingness to Change and Technology Integration

The pivotal role of teachers as the change agent in regard to curriculum reform and implementation has been discussed since decades ago. A curriculum can accommodate teachers' change by allowing teachers to grow and develop, in order to fit a curriculum. This has been proposed by Lawrence Stenhouse, a famous British educator described in [18]. Stenhouse further elaborates that the quality of children’s education depends on the quality of their teachers. Therefore, he believes that curriculum change is a social experiment where teachers play a central role [18]. Accordingly, change is a prerequisite for any curriculum implementation to thrive. The verb 'implement' carries two meanings: “carrying into effect” or "to carry into effect" [19]. As such, any implementation effort requires a continuing effort over time or a one-time effort where organisational decision is practised and executed [19].

Meanwhile, teachers have been described as a change agent by [5]. They further elaborate that curriculum change perpetuates some organisational changes. Subsequently, these include individual or collective’s roles changes. Subsequently, a very important study on change was conducted by the Rand study. The study took 4 years to complete, it was a two-phase study which examined a sample of 293 local projects in 18 states in United States. The study has perpetuated various changes in education practices which intensifies the role of teachers as the change agent [20]. In further understanding teachers’ willingness to change, a study by [21] found out that change does not happen outside an individual teacher, but it is resulted from the interaction between an individual and the conditions for change.

Such changes can be extended to changes in the dynamics of how organizational members have to align their thinking and behaviour towards other organizational members. [5]. For example, technology integration applauds students’ autonomy. Simultaneously, this will change the dynamics of the role relationships between a teacher and his or her students. This can be simplified by bringing the student-centred approach where it relinquishes the teachers’ autonomous role from providing the “teacher-sanctioned answers” to peer based learning is one of the characteristics implied by change perpetuated by curriculum implementation [5]. In the same vein, this is not the kind of change applauded by every teacher. Accordingly, the infusion of technology integration dictates more than
changes in role relationship. Therefore, this explains why problems normally surface in the attempt to put changes and technology integration into practice.

Meanwhile, teachers' confidence to integrate technology and competent demonstration of pedagogical change cannot serve as a sole judgement in ensuring successful curriculum implementation. For example, even though teachers are confident to incorporate technological pedagogical content knowledge (TPACK) where the curriculum requires teachers as the curriculum change agent to change their pedagogical practice, it is teachers' professional development which plays a crucial role in ensuring teachers can imply the designed lessons attain its highest level [22].

Even in developed country like United States, there are many factors which interfere with the integration of technology. For instance, teachers' resistance to engage in technology may stem from the difficulty to use the technology. This will make change which is one of the characteristics of successful curriculum implementation becomes very challenging. Even though when teachers are willing to adopt for the new technology to be integrated into their traditional pedagogical approach, however without comprehensive training, teachers cannot adorn change [23].

Generally, teachers display diverse levels of changes in acquiring technology. Initial stage reports teachers may refuse to use the technology and repudiate its benefits. However, they may proceed to the second level where they engage in the personal level use of technology. During the third stage, they may increase their personal use and use technological jargon. Next, teacher's conviction of technology will see them integrate the technology in class. Finally, teachers' technology integration is employed to enhance high order thinking skills in student centred learning settings [24]. Therefore, as far as teachers' change and technology integration are concern, persistent efforts should be strategized by education stakeholders when it comes to technology integration prescribed by a new curriculum.

Finally, as far as teacher change is concern, the roles of personal factors in engaging teachers for technology integration are prevalent. As such, teachers' experience and self-efficacy are two factors found significant in determining their perceived use of technology integration and the ease to use technology [7]. Therefore, identifying and understanding what perpetuate, delay or distort teachers to embrace change in technology integration are essential in ensuring successful implementation of a curriculum.

4. Conclusion

The infusion of technology has prompted schools to invest in purchasing multiple technology resources like laptops, digital cameras, projectors, and interactive whiteboards [25]. However, these efforts are at high risks of being futile if existing and potential barriers to successful implementation of a curriculum failed to be identified and eliminated. [8] attributes teacher' reluctance to change, teachers' beliefs and established classroom practices as intrinsic factors which are capable of impeding the integration of technology. In the same vine, teachers' episodic memories as one of the sources of teachers' beliefs may also limit technology integration [26]. However, changing teachers' beliefs may provoke certain conflicts within teachers. In solving the matters, reconstructing teachers' beliefs is seen as mandatory [26]. Teachers change is hard to attain but possible. Simultaneously, establishing comprehensive understanding on teachers' beliefs and their willingness to change are equally important in implementing a curriculum. Therefore, this paper views that these two constructs are crucially needed in any curriculum implementation when technology integration comes into focus.

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