

A Literature Review on Peers' ICT Support, Teachers' ICT Support and Family Involvement on Students' Engagement in ICTS for Learning Mathematics among Iranian Secondary School Students

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Abstract

This paper is an attempt to propose a framework for elucidating the effects of Information Communication Technology (ICT) in enabling high-school math students' capacity and facilitating students' learning desire and involvement. The paper also argues that students' engagement with ICT is boosted as a result of the ICT utilization and entails their teachers' sustenance, peers' influence, and family support. In other words, it is argued that getting engaged with ICT plays an instrumental role to stimulate teachers and peers support along with family involvement. Namely, a triangle is formed that contributes to the learning desire towards ICT engagement for approaching math. To this goal, the paper empirically demonstrates that the application of ICT among Iranian secondary mathematics students has resulted in positive output. For measuring the independent variables such as school leadership, teachers' higher productivity, peers' ICT support and family involvement under ICT introduction and presentation in mathematics classrooms, this study utilizes the data collected from the respondents regarding their opinions about the effect of ICT engagement in learning Mathematics. The study will also play an essential role in linking the gap that exists in ICT research between Iranian education center and the rest of the world.

Keywords: School ICT Leadership, Teachers' Support, Peers' Support, Family Involvement, Iran, Students' Ict Engagement

Introduction

Published studies indicate that ICT has brought dramatic changes in several aspects of human endeavor, including education. ICTs have transformed the world into "Global Village" where events occurring in different parts can be instantaneously reported within a matter of minutes via different kinds of telecommunication platforms and devices (Jeyashree & Ravichandran, 2013). ICTs are considered as the umbrella for all tools of technology, such as radio, television,

cell-phone, computer, software, and the likes (Peterson, 2009). These techniques are used on a daily basis in shops, offices, hospitals, households, education institutions, governmental bureaus, and through other communication applications. Accordingly, limitless information is available to students and organizations/institutions around the world in such a way that has affected the concept of learning and caused it to change into a lifelong experience (Ertmer & Ottenbreit-Leftwich, 2010).

Students' engagement in information Communication and Technology (ICT) and its effects on their ICT usage behavior especially at the middle school and secondary levels has become a topic of interest to many researchers across the globe in recent times. Some of the studies that have significantly contributed to the development of a framework for engagement studies include Kuh (2001) and Fredrick (2004), Mann (2001) and Krause (2005). However, according to Krause (2008), the most refined framework so far, was the one developed for the National Survey of Students Engagement (NSSE, 2005) in the United States of America. The theoretical underpinning of students' engagement research has been instituted from the constructivist view of learning that upholds the active and collaborative participation of the learner in the learning process (Krause & Coates, 2008; Lutz & Culver, 2010; Zhao & Kuh, 2004). Interestingly, learning with technology studies have shown that ICTs can positively simplify the constructivist-oriented teaching and be learning (Jonassen, Howland, Moore, & Marra, 2003).

Considering the amount of research efforts in students' engagement, the importance of integrating ICTs in students' learning is fundamental to their effective academic growth and development. Unfortunately, in today's classrooms, teachers are faced with the task of preparing students for jobs that do not yet exist (Forehand, 2014). But to ensure that students are committed to the use of ICTs in their learning activities, educators must teach them with ICTs (Trilling & Fadel, 2009). Literature has established a link between students' engagement in ICTs and how they use them, emphasizing on the relevance of ICT skills for students learning success, creativity, and innovation (Gilbert, Morton, & Rowley, 2007; Harris, 2008). Unfortunately, research efforts that focus on investigating how students are engaged in ICTs, in school or after school, have remained quite scanty over the past few decades (Lim & Chai, 2004). To sum up, students' mathematics engagement in ICTs is central to ensuring students use of ICTs in learning mathematics. Hence, this study specifically examines the efforts involved in incorporating students' ICT engagement in the classroom to promote learning Mathematics among them.

ICTs in Iranian Secondary Schools

Integrating ICTs in secondary school systems has become one of the important preoccupations of countries of the world, including Iran. Although Iran uses the European standards for ICT integrations and uptake, it is, however, ironical to say that most of the secondary schools in the country have not yet been permeated with ICTs (Abbasi, Niaraki, & Dehkordi, 2008). Nonetheless, Iran's National Internet Network scheme that started in September 2006 has now

registered several domestic users who are enjoying services at far lower costs than in other countries.

As a result, the country has become the world's fourth largest country of bloggers with more than 94% of government and industrial entities using networks with access to various databanks (Abbasi et al., 2008).

ICT integration implies extending the use of computers beyond specialist courses and individual projects to the everyday practice of mainstream schooling, (Ruthven, Hennessy, & Brindley, 2004). It was reported in Fathi Vajargah and Saadattlab (2014) that computers have been in use for administrative purposes in Iranian schools for the past several decades but were inducted into the classroom during the 1990s. During that period, the Iranian Ministry of Education initiated the development of educational information technology program by designing and implementing comprehensive informatics systems for schools in Iran. Accordingly, the main objective of the ministry was to establish Management Information Systems (MIS) for schools, geared by automated operational procedures and modern information tools for planning, implementing and monitoring the expansion of qualitative and quantitative educational activities (Ebadi, 2004).

The Iranian Ministry of Education, together with the private sector, implemented several ICT projects to apply these new technologies in schools and other areas of the educational system (Copriady, 2015; Fathi Vajargah & Saadattlab, 2014). Accordingly, it was observed that one of the significant indicators of ICT integration in schools is the computer-student ratio (Cross & Adam, 2007; Punie, 2007). Hence, reports published by the Iranian Ministry of Education have revealed that the computer-student ratio among Iranian schools increased from 1:300 to 1:48 by the end of the year 2007; but this ratio was within the range of 1:10 in European countries during the same period. However, as at 2014 the computer-student ratio among Iranian schools has even increased from to 83:1 (UNESCO, 2014). To step up to the ICT challenges at stake, the Iranian government included the ICT application development program in education and initiated actions to improve the competency of Iranian authorities to transit from traditional education to e-learning. The government also went ahead and included the provision of computers and skills to students in its strategic ICT plans. However, applying ICTs in education is more than just hardware - it is a culture, a program, an active educational process that defines the content of modern education (Ebadi, 2004). Hence, the Iranian government had to affect her educational institutions positively, through programs that were geared towards ICT developments and the overall improvements in the educational sector of the country (Fathi Vajargah & Saadattlab, 2014).

While it is pertinent to emphasize that adequate room must be provided for Iranian students to be involved in ICT implementation processes in schools. Additionally, the efforts towards providing ICT facilities in Iranian secondary schools must be reinforced in such a way that ensures that the facilities permeate the schools. Hence, the focal point of this study is to

propose a conceptual framework to explain the influence of school ICT leadership, peers' ICT support, teachers' ICT support and family involvement on students' engagement in ICTs. By the assumptions of Decomposed Theory of Planned Behavior (DTPB) by Taylor and Todd (1995) and the Engagement Theory by Kearsley and Schneiderman (1999).

Theoretical

The theories of this study suppose that school ICT leadership, peers' ICT support, teachers' ICT support and family involvement have a significant influence on students' engagement in ICTs, for learning Mathematics among Iranian secondary school students. The theoretical underpinning of the assumption of this study is based on the works of Taylor and Todd (1995) in Decomposed Theory of Planned Behavior (DTPB) and Kearsley and Schneiderman (1999), in Engagement Theory.

Decomposed Theory of Planned Behavior

The Decomposed Theory of Planned Behavior (DTPB), which was developed by Taylor and Todd, (1995), has identified and explained certain specific beliefs that determine technology usage behavior and it has investigated the roles of peer influence, family support and teachers' support. The DTPB has decomposed the determinants of ICT usage behavior into belief-based indirect measures, so as to provide an increasing explanatory power and a more precise understanding of technology acceptance behavior (Sadaf, Newby, & Ertmer, 2013). Findings have shown that the TPB explained students' acceptance of learning with ICTs reasonably well and more specifically, subjective norm, and behavioral control positively influenced their intention to learn with ICT (Cheon, Lee, Crooks, & Song, 2012). From the preceding, the variables that connect this study with the DTPB are peer influence, family support, and teacher support. These important variables are part of the constructs to be investigated in this study and hence, they justify the suitability of the DTPB theory for this study.

Engagement Theory

Engagement Theory was propounded by Kearsley and Schneiderman (1999), from the perspective of the framework of technology-based teaching. The underlying assumption of the theory is that technology can facilitate engagement in learning activities. This implies that for students to be meaningfully engaged in learning activities they need to be engaged with technology. This linkage between engagement and use of technology is part of what gives this study its theoretical underpinning. But the new perspective of the engagement theory assumes that an ICT-based environment provides the best learning experience to students; the kinds of experiences they face outside the school system (O'Brien & Toms, 2008).

Studies have established that students' engagement incorporates the affective, behavioral and cognitive aspects of students' learning activities including their involvements with ICTs for academic purposes (Gregory & Lloyd, 2010). Hence, in this study, the practical aspects of students' ICT engagement are central to the students' feelings towards engaging themselves in ICTs; while the behavioral aspects of their engagements are essential to their observable

actions and performances that relate to learning with ICTs. Similarly, the cognitive aspects of students' engagement include the students' perceptions, attitudes, and beliefs toward learning with ICTs (Appleton, Christenson, Kim, & Reschly, 2006; Jimerson, Campos, & Greif, 2003). Overall, the engagement theory fits with this study because it provides the theoretical underpinning for investigating the presumed affective, behavioral and cognitive relationships that exist between students' engagement in academic activities and their use of ICTs for learning mathematics.

School Leadership Model

School Leadership has to do with the school management's commitment to giving direction towards ICT implementation among their schools (Palomba & Banta, 1999). It has a significant influence on students engagement in academic learning and achievements in mathematics classroom (Dotterer & Lowe, 2011). The school ICT Leadership Model (SILM) was propounded by Park View Primary School (2013) to advocate the integration of ICTs in teaching and learning within the primary/secondary school systems. The model assumes that school ICT leadership is fundamental for directing teachers' use of ICTs and pupils' involvement or engagement in learning with ICTs.

Empirical evidence has shown that principals who advocate the use of ICTs to enhance learning and teaching in their schools are often faced with a lot of leadership challenges which are scarcely being investigated by researchers in education (Kay, Meyer, Wagoner, & Ferguson, 2006; Slaouti & Motteram, 2006). Similarly, the daily work of school principals in ICT-enriched environments has not been well examined in educational leadership research. The link between school ICT leadership and students' engagement in ICTs was positively established in a recent. A study by (Reynolds and Chiu (2015), yet owing to the sparse research on ICT leadership, the literature that provides the frameworks of most ICT Leadership studies are mainly drawn from the most common research exploring ICTs as learning tools and as catalysts for educational change (Watts, 2009).

From the few studies conducted, school ICT leadership has been positively associated with students' engagement in ICTs (Park View Primary School, 2013), (see Fig1). The Park View Primary School model has emphasized on the role of school leaders through directing the implementation of ICTs in the school system while engaging (involving) students in the process so as to commit them to the objectives of the school ICT policies. The model also suggests the supportive roles of teachers, through ensuring that they teach students with ICTs. The school ICT leadership fits with the current study because of it underpins the effect of school ICT leadership in determining students' involvement/engagement to the fundamental purpose of this study. The model also advocates the integration of ICTs in teaching and learning and supports the involvement of students in ICT implementations policies that key issues are all important aspects of this study.

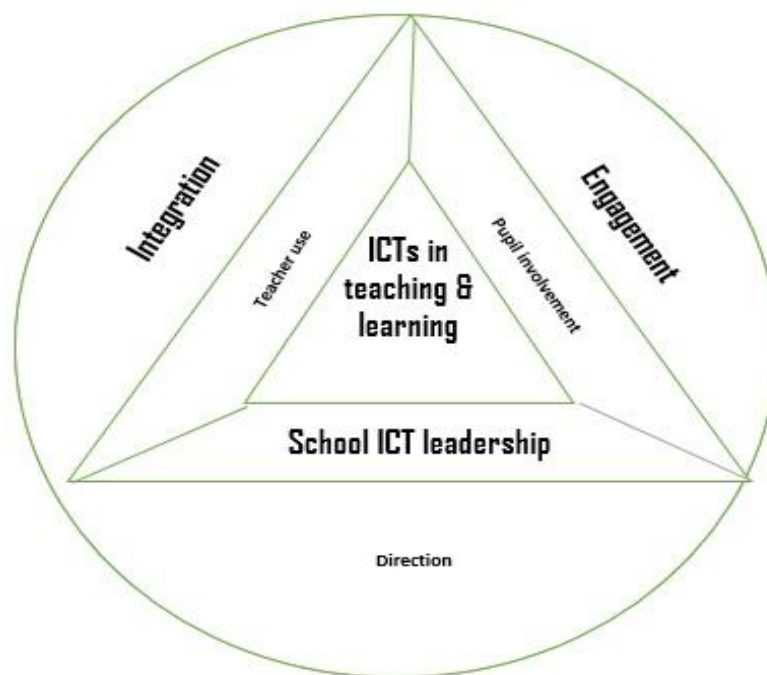


Figure 1

Conceptual Framework

The conceptual framework of this study was based on studies by (Taylor & Todd, 1995) for Decomposed Theory of Planned Behaviour (DTPB), G. Kearsley and Shneiderman (1999) for The Engagement Theory, Davis, (2003) for Technology Model and School ICT Leadership Model of (Parkview, 2013). The central assumption of the study is that Teachers ICT Support, School ICT Leadership, Family ICT Involvement, Peers ICT Support, will directly influence Students ICT Engagement in learning Mathematics.

DTPB was used in the study to investigate the roles of peer influence, superior influence (including family support and Teacher support). Engagement Theory gives this study the theoretical underpinning of investigating students' engagement in ICTs as a multidimensional construct, encompassing the affective, behavioral and cognitive aspects of the students' academic predispositions (Gregory & Lloyd, 2010; Marshall, 2007). Additionally, the researcher will be analyzed the tenets of the engagement theory to offer support for its use as the framework for the study, and to identify gaps in the literature regarding the use of the engagement theory (Swan, 2012). Similarly, the School ICT Leadership Model (SILM) provides the theoretical underpinning for this study for investigating the role of school ICT leadership in influencing students' engagement in ICTs for learning mathematics. The researcher intends to investigate the existing relationships among the variables listed above and develop a model that will explain and predict the interactive effects among the variables in the model. Fig.2 below depicts the conceptual framework of this study.

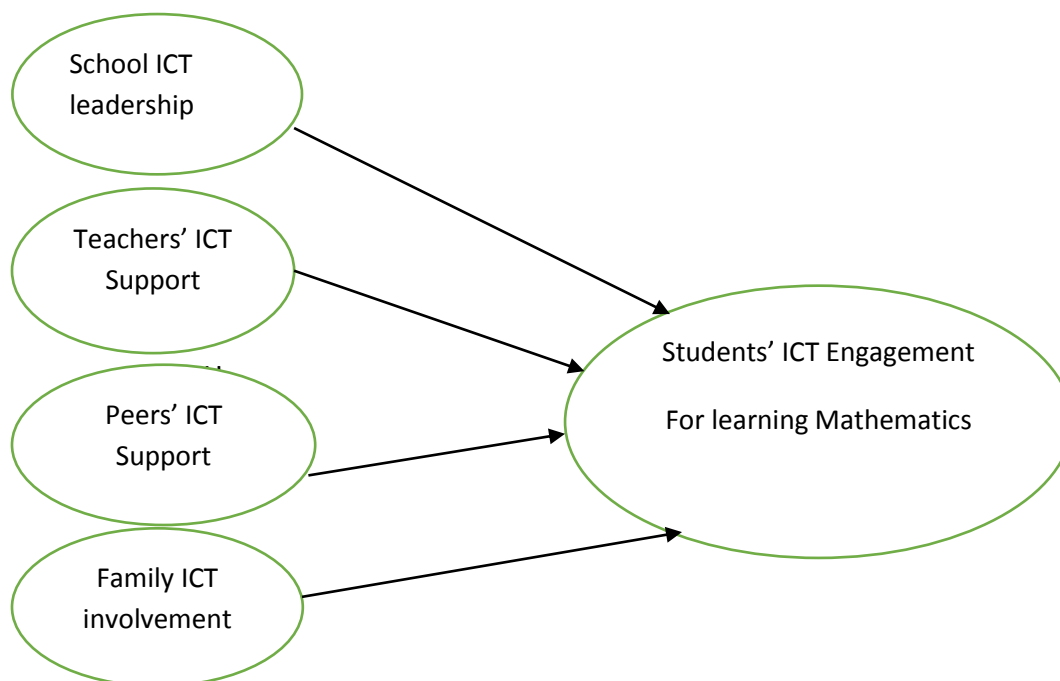


Figure 2. Model of Factors Influencing Students' ICT Engagement for Learning Mathematics

Research Objective

The purposes of this study were to identify:

The relationship between the school ICT leadership, teacher' ICT support, peers' ICT support and family' ICT involvement with students' ICT engagement for learning Mathematics.

School ICT Leadership

School leadership has been defined as a process by which school leaders bear the responsibility of managing changes and innovations that support teaching and learning with ICTs in schools (Moyle, 2006). School Leadership was also defined as a process by which school leaders plan, implement and evaluate the integration of ICTs in their schools for the purpose of improving students' learning (McGarr & Kearney, 2009). In this study, school Leadership is defined as a process by which secondary school principals implement and evaluate the integration of ICTs in their schools for the purpose of improving students' learning in mathematics. Hence, for an effective ICT leadership in schools, school leaders must initiate and implement important changes in the school climate that can facilitate the integration of ICTs into learning, teaching and school administration (Javidan & Carl, 2004). Principals who advocate ICT leadership gain deeper understanding of their staff and find quicker solutions to complex situations while using available information to resolve problems in the school (Adeyanju, 2015). The study has also shown that school leadership has a significant influence on students' engagement in academic learning and achievement (Dotterer & Lowe, 2011). School Leadership has to do with the school

management's commitment to giving direction towards ICT implementation among their schools (Palomba & Banta, 1999).

Studies have shown that effective school ICT leadership improves principal-teachers' relationship in secondary school management generally and it has rapidly become one of the most important and widely discussed issues in contemporary education policy. Principals who advocate ICT leadership gain deeper understanding of their staff and find quicker solutions to complex situations while using available information to resolve problems in the school (Adeyanju, 2015). Overall, school leaders have to lead by example. Their commitment to giving direction towards ICT implementation in the school must be reinforced through continuous development of their ICT potentials relentlessly. Therefore, in this study, Hypothesis H1 proposes that school ICT leadership support influences Mathematics students' engagement in ICTs.

Teachers' Support

Teachers support has been defined as the extent to which teachers encourage students to cope up with the challenges of technological upheavals in the course of their learning experiences (Tondeur, Van Braak, & Valcke, 2007). In this study, the teachers' useful suggestions to students concerning engaging with ICTs for learning mathematics. Teachers' ICT support is crucial for the effective students' engagement in ICTs. Teachers' ICT support may be referred to like any form of technical support and assistance that comes from the teachers or experts to solve ICT related problems (Arteaga Sánchez, Duarte Hueros, & García Ordaz, 2013; De Smet, Bourgonjon, De Wever, Schellens, & Valcke, 2012). There is various literature teachers' support with ICT engagement. For instance, a study by Phillippo and Stone (2013) have shown that significant positive impacts of teachers' ICT support on students' ICT engagement in learning.

Congruently, a study conducted in the USA by Latio (2009), has shown that students find it easier to engage in learning in classes where they are taught with ICTs and assigned to use to same for learning. Hence, integrating ICTs in the teaching process often yields positive developments and changes in curriculum structure and brings reforms to lessons content and structure as well as to the general performance and measurement tools used (Fathi Vajargah & Saadattlab, 2014). Whereas in the most parts of the world the most practical steps for integrating technology in secondary school engaging them in ICTs are being taken, but Iran things have remained unchanged (Karami & Attaran, 2013). Teachers' support is of significant importance to ensuring that students are engaged in ICTs. Also, teachers' support can improve students' engagement nonetheless; it is equally likely that students' active engagement can boost teachers' provision of autonomy support. Thus, a significant gap exists in this literature that prevents us from drawing the conclusion that if teachers would adopt a more autonomy supportive style, then their students would show increased engagement (Shernoff et al., 2016).

Hence, through teaching students with ICTs, the teachers, can help them develop competencies for self-directed and collaborative learning with experiences that suit the best learning incentives (Palomba & Banta, 1999). While it is the responsibility of teachers to ensure that

they give their students maximum support and guidance towards engagement and use of ICTs, school authorities have the task of giving proper training to teachers so as to properly equip them for the challenges of their teaching roles. Therefore, in this study, Hypothesis H2 proposes that teachers' support influences mathematics students' engagement in ICTs.

Peers' Support

Peers involvement and support with how their contemporaries associate with ICTs have significant effects on students' general learning and engagement in ICTs (Sullivan, Marshall & Tangney, 2015). Studies have shown that peer support has the high influence on students' performance in schools, directly or indirectly (Kubiatko & Haláková 2009). The roles of peer influence in determining individuals' engagement in behavioral performance was advocated in DTPB. School authorities need to give proper attention to the roles that peers play about how students are engaged in ICTs. Empirical evidence has shown that peers influence has significant effects on students' general learning and engagement in ICTs (Sullivan, Marshall, & Tangney, 2015). Studies have shown that peer support has the high influence on students' performance in schools, directly or indirectly (Kubiatko & Haláková, 2009). Extant research has verified that peer influence has significant effects on students' engagement with ICTs in schools (Voigt, 2009).

Since students mingle with their peers in the school/outside the school and are affected by their influence, school authorities need to give proper attention to the roles that peers play about how students are engaged in ICTs. More studies have identified significant effects of peers influence on students learning activities and performances (Cutrona, Cole, Colangelo, Assouline, & Russell, 1994; Furrer & Skinner, 2003; Gonzales, Cauce, Friedman, & Mason, 1996). On the whole, peer influence has an important effect on students' engagement with ICTs. Whether in the school or outside the school, students mingle with their peers and are affected by their influence. Overall, school authorities need to give proper attention to the roles that peers play about how students are engaged in ICTs and use of ICT in learning Mathematics. Consequently, in this study, Hypothesis H3 proposes that peers' ICT support influences mathematics students' engagement in ICTs.

Family Involvement

Family ICT involvement was defined as a process by which families are involved in providing ICT-related supports to students such as ownership of ICT tools and supervision of the use of such ICT tools (Stevenson, 2011). In this study, family ICT involvement is defined as the extent to which parents provide their teenagers with ICTs to support them in learning mathematics. Parent's interaction with a child has a large effect on the kind of person that the child will become (Shernoff, Csikszentmihalyi, Shneider, & Shernoff, 2003). Empirical evidence has shown that parents have a positive higher influence on students outcome and their academic performance in the school (Chew, 2016).

In a study conducted at the University of Chicago, by Shernoff et al. (2003) characteristics of the family were among the common factors that influence student engagement in school activities. Presumably, the characteristics of a family about how they support their wards regarding providing them with ICTs will also influence how the students engage with ICTs in school as well as how they eventually utilize to such ICTs for learning purposes. Findings in Leithwood and Jantzi (2000) has shown that family involvement influences student engagement in school. Similarly, findings in Mombourquette (2007) have shown that parents involvements in students' learning have the strong impact on the student's engagement in their learning activities. In a study conducted in United Kingdom findings have shown that most parents support and encourage children's use of digital devices for their professional development and learning purposes (Judge, Floyd, & Jeffs, 2015). A recent study conducted in Iran has shown that parents believe that they have the direct influence on students' learning engagements and achievements (Rahimi, Ebrahimi, & Eskandari, 2013). Hence, parental involvement has significant effects on students learning with ICTs in mathematics classrooms (Fan & Chen, 2001; Reynolds & Chambers, 2015).

Overall, parents' involvement in their children's academic learning contributes significantly to the extent to which schools succeed in involving students in their ICT implementation policies. Quite often, parents' involvement in their children's education has been very supportive of the efforts of schools towards engaging students in the use of ICTs for learning. Hence, school authorities have the task of inventing necessary strategies that will give room for parents to be fully involved in students' learning activities in the school. Hence, in this study, Hypothesis H4 proposes that parents' involvement influences mathematics students' engagement in ICTs.

Students' Engagement in ICTs

Students' ICT engagement refers to the process by which students are encouraged to participate in decisions for ICT implementations so as to maximize their ICT potentials for the purpose of academic learning (Tacchi & Watkins, 2007). In this study, students' ICT engagement refers to the extent to which students are encouraged to participate in decisions for ICT implementations in learning mathematics. Students' engagement in ICTs suggests the involvement of the students in ICT implementation decisions and processes for schools about how the decisions and processes affect the students in their studies and help them in accomplishing their tasks (Park View Primary School, 2013). From general educational perspectives, the term students' engagement has often been used in various ways to match the circumstances of its use (Forehand, 2014). Students' engagement in school learning is perceived as a sign of effective classroom instruction, and a consequence of the school activities to improve learning (Kubiatko & Haláková, 2009).

Students' engagement in ICTs suggests the involvement of the students in ICT implementation decisions and processes for schools about how the decisions and processes affect the students in their studies and help them in accomplishing their tasks (Park View Primary School, 2013). ICT engagement is also identified as student's enthusiasm, desire, requirement, and obligation

to partake in and accomplish the school ICT implementation plans and processes (Kubiatko & Haláková 2009). It was reported in Park View Primary School, (2013) that involving students in ICT implementations have significant effects on the students' use of ICTs as well as the successful integration of ICTs in schools. Students' ICT engagement refers to the process by which students are encouraged to participate in decisions for ICT implementations so as to maximize their ICT potentials for the purpose of academic learning (Tacchi & Watkins, 2007).

Studies have shown that students who are fully engaged in schools tend to achieve higher levels of academic success than students who are not engaged (Hazel, Vazirabadi, & Gallagher, 2013). Kubiatko and Haláková (2009) has observed that although student engagement has been used as a construct in several studies to reconnect bored and disengaged students with the desire to learn, most researchers have used the term differently. However, students' engagement in the classroom and school is an important determinant of the students learning outcomes and achievement, which is also associated with the students' engagement in technology in recent times (Chen, Lambert, & Guidry, 2010; Lin, Hmelo, Kinzer, & Secules, 1999). In a study conducted among students in the USA, findings have shown that there is a positive relationship between the use of technology for learning and students' engagement in technology and their academic performance. An exploratory study conducted in India, voluntarily engaged in mobile learning has shown that the use of ICTs for learning brings significant improvement in the level of academic learning and motivation among students (Sampath Kumar & Biradar, 2010). This study has operationally defined students' ICT engagement as a multi-dimensional construct that is comprised up of three critical dimensions which are indicative of affective, cognitive and social or behavioral engagement in technology-rich classrooms. To engage students in ICTs, they need to be mindfully engaged in intellectual activities that support collaboration and working with ICT tools along with other students.

Overall, students' engagement in ICTs is crucial to ensuring that they use ICTs in learning. Hence, this study specifically examines the effort involved in incorporating ICTs into active engagement strategies in the classroom to promote learning awareness. More importantly, technology-rich classrooms produce positive changes in student engagement, and it supports the use of technology within the context of meaningful practical assignments, which allow for exploration and experimentation (Sandholtz, Ringstaff, & Dwyer, 1994). However, the lack of sufficient empirical studies notwithstanding, a set of assumptions about students' math engagement in ICTs This implies that school authorities in Iran must ensure that adequate facilities are provided in public and private schools so as to support government's campaign for students' engagement and use of ICTs in learning.

Conclusion

This paper was an effort to establish and prove the hypothesis that when ICTs are properly employed in educational activities and activating collaborative background knowledge to develop common understanding of students, it brings about positive outcomes. However, the utilization of ICT in the Iranian education has been characterized by the issues that relate to the

attitudes of school leadership, teachers, peers and families in supporting and getting involved with ICT. Because teaching, intentions towards students' ICT engagement in the classroom is subject to whether those teachers belong to the old generation or not, namely, if they are willing to adopt ICT in their classrooms or still believe in the traditional methods of teaching math as a more productive way. Thus, regard ICT as irrelevant if not counterproductive in this matter. Therefore, it seems that the ICT engagement in the Iranian educational environment is still in an infancy stage and inconclusive, which the first group advocates more efforts from the authorities to put forward investment plans for research and facilities in the ICT advancement whereas the latter thinks otherwise.

Nonetheless, in general, the study shows close linkages and affinities between school ICT leaderships, teachers support, peers support, and family involvement coupled with students' engagement in mathematics classrooms. The Decomposed Theory of Planned Behavior (DTPB) by Taylor & Todd, (1995) and The Engagement Theory propounded by Kearsley and Schneiderman (1999) and School ICT Leadership Model (SILM), fixed with extant literature have invariably revealed such significant direct effects of school leaderships, teachers support, peers support and family involvement for ICT engagement. Empirical evidence has shown that students' engagement in Iran about ICT has been so far weak. Because the opponents argued that ICT has inversely affected math students and thus, advocate the traditional methods as superior in teaching math in Iran over applying ICT. Consequently, a positive generalization of the ICT effect in repletion of students' mind in all content areas should be taken with caution. Because attributing such a role to ICT at a higher level of perceived learning, as has been suggested, entails further investigation through empirical studies in the Third World countries. In addition, it is an essential note that each author works on different variables. As a result, there may be various status for a specific variable. It critical to understand the context of the situation

One important contribution is we could identify the main and the lesser important focus of each study. Consequently, we could determine the contextual background of the findings. Finally, one could Mach the various findings with setting in order to have a comprehensive understanding that would be able to improve one's situation. Therefore, it is expected that for applying the proposed model, researchers must further investigate the consequences of ICT on math students at the secondary level that will mainly unfold important revelations, which would significantly contribute to the body of knowledge in general that is immensely beneficial to learners all over the world as it will also serve to resolve the conflict between the opposite camps in Iran over the right method of teaching math at the secondary level.

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