Exploring Teachers' self-efficacy towards ICT integration in government primary schools of Bangladesh

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ABSTRACT

This study reports on the level of ICT self-efficacy and the key sources that contribute to high ICT self-efficacy among the teachers of government primary schools of Bangladesh. A mixed-method design was used to guide the methodology of this study where a 5-point Likert scale (Technology Integration Self-Efficacy Scale, TISE scale) was used to collect data from 60 primary school teachers of Moulvibazar district to measure the level and 8 teachers who scored high among them were interviewed to identify the sources of high ICT self-efficacy. The study revealed that the levels of sampled teachers' self-efficacy toward ICT integration were high. It was also found that prior experience of ICT knowledge, sound technological pedagogical content knowledge (TPACK), capacity building programs and technological and educational support from different tiers including school were the key sources of teachers' ICT self-efficacy.

Keyword: - *Self-efficacy, ICT integration, sources of self-efficacy, Bangladesh, ICT self-efficacy.*

1. Introduction

ICT (Information and Communication Technology) integration in teaching-learning processes promotes powerful teaching-learning environments as it improves the teaching and learning process (Aydin, Gürol and Vanderlinde, 2016; Buabeng-Andoh, 2012), improves student-centred active learning (Fructuoso, 2015), boosts student's achievement (Dibaba and Babu, 2017; Kisirkoi, 2015) and makes a difference for the quality education (UNESCO, 2017). As a result, more attention is being paid to ICT integration in the teaching-learning process in both developed and, particularly, developing countries (Aydin and Gürol, 2016). The government of Bangladesh (GOB) also took the initiatives to integrate ICT in education and started to implement from 2009 through National ICT policy (Babu and Nath, 2017). In 2010 GOB came out with a new education policy where they emphasized the integration of ICT as a medium of instruction and set a goal to achieve ICT skills for every student (NEP, 2010). But the picture is not encouraging with regards to achievement as ICT integration in education is still an on-going process in Bangladesh and it is not easy to shift traditional pedagogical practices by this emerging instructional method. It is still far from feasible for schools to benefit effectively from the use of ICT in education (So and Swatman, 2016) as most of the schools are not ready to integrate ICT into their daily teaching-learning activities (Khan et al., 2012). These findings indicate that there is a gap between policy and practice and give causes for concern. If we want to make Bangladesh's primary education fully ICT integrated, then we must know what is wrong in addressing this issue and what is to be done.

According to Hew and Brush (2007), the knowledge, skills, attitude and self-efficacy of ICT integration can impede the ICT integration as teachers' instructional decisions and classroom practices are affected by their beliefs and self-efficacy towards ICT integration (Alhassan, 2017; Kazan and ELDaou, 2016; Letwinsky, 2017). Hence, to address the national issue and explore the reasons why this may be so in Bangladesh, it is essential to look at the ICT integration in education through the lens of teachers' self-efficacy. I am responsible as an education officer to promote ICT integration in the teaching-learning process as education officers provide academic leadership to ensure quality education (ODCB Guidebook, 2009) and ICT integration into teaching-learning processes enhances the quality of education (Rabah, 2015; Yamamoto and Yamaguchi, 2016). From this point of view, this research is worthy of investigation. Again, identification of the findings of this study and the factors that shape teachers' self-

efficacy towards ICT integration would provide additional information that could help the GOB to understand the loopholes that exist between the present practice and the expected goal of using ICT in education policy. It would help assist in policy making, practitioners, education and curriculum reform initiatives for ICT integration. The study may also contribute to the existing literature on ICT integration in the classrooms in Bangladesh. More importantly, the study may improve pedagogical practices in government primary schools of Bangladesh. From this point of view, this study is much more significant.

2. Purpose of the Study

The study aims to investigate teachers' self-efficacy towards ICT integration into teaching-learning processes in government primary schools of Bangladesh. To address the research aim, the study will try to find the answers to the following research questions:

- What is the level of teachers' self-efficacy towards ICT integration into teaching-learning processes in government primary educations of Bangladesh?
- What are the key sources of teachers' self-efficacy towards ICT integration?

3. Literature Review

ICT integration in education generally means technology-based education that is closely related to the use of digital technologies in classrooms (Ghavifekr and Rosdy, 2015). ICT integration includes using laptops, digital contents, software and internet for instructional purposes in the classroom to enhance the teaching and learning quality (Hew and Brush, 2007; Unal, Yamac, and Uzun, 2017). On the other hand, self-efficacy is defined as an individual's belief in his or her own competence to carry out necessary actions to produce the expected outcomes successfully (Bandura, 1997; Skaalvik and Skaalvik, 2010; Yamamoto and Yamaguchi, 2016)). When people do not believe in their own ability to produce the desired effect through their acts, they are not motivated enough to carry out the action (Schunk and Pajares, 2009). Hence, high self-efficacy provides greater motivation to meet targets and feel better in coping with adverse situations (Bandura, 1993; Harrison et al., 1997).

Self-efficacy towards ICT integration is defined as beliefs in his or her capability to integrate ICT effectively in the teaching and learning process (Skoretz, 2011). Teachers with high self-efficacy towards ICT integration may apply different teaching methods, digital content using a student-centred approach; contrast, teachers with low ICT self-efficacy are said to have a more teacher-centred teaching tendency in the classroom (Henson, 2001; Perkmen and Pamuk, 2011; Gilakjani, 2013). Yamamoto and Yamaguchi (2016) emphasise that knowledge and skills are not sufficient to alter teachers ' behaviour unless they are confident that they can facilitate learning through acquired ICT skills as teachers' ICT self-efficacy influence them to incorporate ICT in their teaching-learning processes (Bakar, Maat, and Rosli, 2018; Raphael and Mtebe, 2017).

According to Bandura's self-efficacy theory (1997) self-efficacy origins from four key sources namely mastery experiences, social persuasion, vicarious experiences and psychological responses (Unal, Yamac, and Uzun, 2017). The experiences of conducting lessons, observing practicing teachers, encouragement and support of schools; and physiological and emotional states influence teachers' self-efficacy towards ICT integration (Al-Awidi and Alghazo, 2012; Albion, 1999). On the other hand, Odanga, Raburu and Aloka (2018) highlighted better salary, improved working environment, capacity building programs and leadership styles as the sources of high ICT self-efficacy. Dube, Nhamo and Magonde (2018), Murphy and Greenwood (1998) and Tondeur et al. (2012) also emphasized on capacity building programs while experience of ICT use was highlighted by Anderson (2006), Arslan (2012), Aslan and Zhu (2015), Bandura (1997), Birisci and Kul (2019), Isman, Evirgen and Cengel (2008) and Paraskeva, Bouta and Papigianni (2008). Compeaun and Higgins (1995), Raphael and Mtebe (2016) and Strudler and Hearrington (2008) emphasized the ongoing support for effective ICT integration, which, in turn, can lead to an improvement of teachers' ICT self-efficacy. Schiller (2003) and Yuen, Law and Wong (2003) highlighted the attitude of head teacher and the staff as a key element in successful ICT integration. Malik, Rohendi and Widiaty (2019) and Mishra and Koehler (2006) recommended TPACK (Technological Pedagogical Content Knowledge) as a source of ICT integration as effective ICT integration requires sound knowledge of technology, pedagogy and content to teach content-based curricula effectively with educational technologies.

To examine the connection between self-efficacy and ICT integration in teaching and learning, many studies (e.g. Akgun, Ozgur and Cuhadar, 2016; Alt, 2018; Aslan and Zhu, 2015; Bakac and Ozen, 2017; Birisci and Kul, 2019; Cavanagh and Ma, 2018; Ceylan et al., 2014; Giles and Kent, 2016; Kazan and ELDaou, 2016; Lailiyah and Cahyono, 2017; Letwinsky, 2017; Raphael and Mtebe, 2017; Rigi, 2015; Sari et al., 2016; Sun, Strobel and Newby, 2017; Valtonen, et al., 2018; Yagci, 2016; Yamamoto and Yamaguchi, 2016) have been completed and found that self-efficacy towards ICT integration influences teachers' ability to integrate technology into classroom teaching.

In a study in the United States, Giles and Kent (2016) investigated the level of self-efficacy towards ICT integration of 28 teachers of a college of education by using qualitative design. They found that about 93% of the participants integrated technology into the teaching-learning processes, with 68% of participants having high self-efficacy to select and use ICT in teaching-learning processes. Aslan and Zhu (2015) conducted a study in Turkey where 782 teachers joined a survey with open-ended questions and 15 teachers were interviewed by using qualitative method. They found that prior experience regarding ICT skill has a strong and positive influence on ICT integration in teaching-learning processes. Yamamoto and Yamaguchi (2016) found from a study on 838 primary school teachers of Mongolia that positive attitude of an institution toward ICT integrated education plays a vital role in teachers' ICT self-efficacy. They also found that it is more important to have a sound pedagogical knowledge and experience of ICT to be more self-efficacy.

In Turkey, Birisci and Kul (2019) conducted a study on 174 teachers at the Faculty of Education of a university by using a correlational study model and found that teachers had a high level of ICT self-efficacy, with a positive correlation with techno-pedagogical skills and ICT integration. There was a high and positive correlation between ICT integration and ICT self-efficacy and experience was identified as one of the sources of high ICT self-efficacy of the participants. Raphael and Mtebe (2017) examined teachers' (N = 386) self-efficacy towards ICT integration in the classroom at the two colleges in Tanzania and found that the sources of ICT self-efficacy are supports, ease of use, performance expectancy, and social influence whereas another study by Awofala et al. (2017) stated that perceived usefulness and perceived control was not a factor for teacher's self-efficacy in ICT integration.

The literature review clearly indicates that teachers' self-efficacy towards ICT integration has a significant impact on ICT integration in daily teaching-learning processes and, thus, form a basis for this study. But the findings regarding the sources of self-efficacy in the literature are not strong enough to make a generalization. Again, these research studies are mostly based on qualitative methods and suggested further investigation in both quantitative and qualitative designs. Therefore, it is inferred that there is a need for a more holistic approach to evaluating ICT integration. In Bangladesh, however, the majority of existing studies regarding ICT integration have been concentrated on extrinsic factors, such as lack of infrastructures, poor internet connectivity and speed, and inadequate support. While there are a few empirical studies on teachers' self-efficacy in Bangladesh, teachers' self-efficacy towards ICT integration has been rarely studied, especially in the context of primary education. For these reasons, it is needed to elaborately explore teachers' self-efficacy towards ICT integration in government primary schools of Bangladesh.

4. Methodology

In order to "study in total rather than in fragments" (Cohen, Manion and Morrison, 2011, p. 219), mixed-method design was selected to guide the methodology of this study as the use of both quantitative and qualitative method offers a more clear understanding of research problems than using either method alone (Fraenkel, Wallen and Hyun, 2012). Among mixed-method designs, the sequential mixed methods approach was used in this study rather than parallel or multilevel mixed design as the quantitative (survey) and qualitative data (interview) was collected, analysed, interpreted and compared sequentially rather than simultaneously (Cohen, Manion and Morrison, 2011) and the survey (questionnaire) returned was used as the basis for selection of interviewees (Denscombe, 2010). For first research question, quantitative method was used and for the second research question, qualitative method seemed appropriate as it provides an in-depth, detailed and intricate understanding of meanings, behaviours, attitudes, intentions and actions (Cohen, Manion and Morrison, 2011). For the quantitative part of the study, data was collected through the use of a 5-point Likert scale (Technology Integration Self-Efficacy Scale, TISE scale) survey whereas data was collected with interviews for the qualitative part of the study. The survey questionnaires

and the interview questions had been piloted before with two or three teachers to make sure the questions are understandable and clear.

The sample was purposive and non-random as the study only considered those schools that were using ICT in education because they had the information the researcher wanted. The sample was composed of 60 teachers of govt. primary schools of Moulvibazar district who was selected from 'e-training tracking software' hosted in Upazila Resource Centre and voluntarily completed the survey using the TISE scale. The survey was administered electronically using the online tool Survey Monkey. Survey Monkey automatically analysed the responses, returning an average rating for the TISE scale for each factor. This allowed the participating teachers to be filtered by firstly identifying those who exhibited high self-efficacy towards ICT integration. Then twelve teachers were identified for the one-on-one interview that last from 25 to 35 minutes in length. The survey was carried out during the month of November 2019 and the interviews were carried out over telephone during the month of December 2019.

5. Results

5.1 Teachers' self-efficacy towards ICT integration

In relation to the first research question "*What is the level of teachers' self-efficacy towards ICT integration into teaching-learning processes in government primary educations of Bangladesh?*", descriptive statistics showing the levels of self-efficacy perception of technology integration are shown in Table 1.

Number of Items	Lowest Score	Highest Score	Mean	Overall Mean
19	19.00	95.00	74.86	3.95

Table 1: The Scores of self-efficacy level of teacher towards ICT integration

According to Table 1, the mean score of pre-service teachers from the TISE Scale was 74.86 and the overall mean score was 3.95. A score close to value 5 on the TISE scale refers to participants "Agree" with the statements that measure their perceived self-efficacy towards ICT integration. Thus, it can be said that the levels of teachers' ICT integration self-efficacy is high.

5.2 The sources of teachers' self-efficacy towards ICT integration

In relation to the second research question was "*What are the key sources of teachers' self-efficacy towards ICT integration?*", the interview schedule was tailored and all the eight interviewers were asked exactly the same questions on the sources of teachers' self-efficacy towards ICT integration. Going back and forth again and again between relevant portions of the original transcripts, four themes were identified. These included: *Prior experience of ICT knowledge, Sound pedagogical knowledge, Capacity building programs and Support*. These themes are now presented in turn.

5.2.1 Prior experience of ICT knowledge

Seven participants reported that they felt high self-efficacy towards ICT integration as they had prior experience regarding ICT skill. They boldly mentioned that they were familiar with computer, internet and mobile applications from college years and it had made them more confident about ICT integration. The statements "*Even before I joined the job, I knew how to operate computer with some word processing. It has made me more confident in developing e-contents and conducting multimedia classes (P02)."* Or "*I feel more confidence as I have prior skills about ICT. I work with technologies at home from college life and I used to browse the Internet to get all the answers that I needed (P04)."* Or "*I think the prior experience regarding ICT skills is helping me to a great extend to be so confident in the classrooms to integrate ICT (P07).*" strongly supported their statements.

5.2.2 TPACK (Technological Pedagogical Content Knowledge)

Six participants reported that they had not only technological knowledge but also pedagogical and content knowledge which help them to successfully integrate ICT in the classes. One participant mentioned, "*Many teachers come to me to learn how to develop e-contents as they believe that I have sound knowledge of technology, pedagogy, and content (P04).*" They reported that it was not possible to have high self-efficacy towards ICT integration in classroom without having sound technology, pedagogy, and content knowledge. They believed that proper pedagogical and content knowledge along with ICT knowledge enhanced their ICT self-efficacy. One participant reported, "*If you have only technological knowledge but no pedagogical content knowledge then you can't develop any e-content for teaching learning purpose (P02)*" while another stated, *"ICT integration in classroom requires sufficient consideration of the dynamic and complex relationships among content, technology, pedagogy. So, we have to have sound knowledge of technology, pedagogy, and content (P07)".*

5.2.3 Capacity Building Programs

Six respondents reported that they had got training on ICT in education and it had enhanced their self-efficacy towards ICT integration in teaching learning processes. One of the participant reported "*I have got 12 days for ICT in Education training at the PTI. This training was practical based and was held in a laboratory setting. All the trainers had well developed TOT training under a2i supervisions (P03).*" Another participant boldly said, "*It [ICT training in Education] has a very positive impact on ICT integration in teaching learning processed as it can grow instill confident and motivation to be a successful digital teacher (P05).*" Furthermore, capacity-building programs, according to the teacher respondents, also enriched their technological skills (e.g., downloading materials for developing e-contents, troubleshooting, and developing power point slides). For instance, a teacher reported, "*The training was a journey of learning for me. I have learnt a lot about ICT integration. It went a long way to enrich myself as a national best content developer in Bangladesh (P07)".*

5.2.4 Support

Six participants reported that educational and technical support from different tiers including school played a vital role to increase teachers' self-efficacy and capability to integrate ICT in the classroom. According to the participants, positive school culture and the perspective of the head teacher and their staff along with head teacher's leadership styles motivated them for the integration. The statements "*My head teacher is very positive about ICT integration. He gives us sufficient support and school time to develop digital contents and use them in the classroom. We are encouraged that make us do better [P01].*" or "*We can share our ICT skill and different issues with our colleagues and mentor each other. Sometimes we exchange technical knowledge which enhances our skills of developing rich e-contents (P06).*" support the views. One teacher reported, "*Our head teacher arranged an in-house training in the school with all our teachers to make us familiar with ICT, e-contents and multimedia classes. It made us able to enrich ourselves and develop e-contents very easily (P04)".*

6. Discussion

The attempt of the study was to identify the level of teachers' ICT self-efficacy and the key sources of teachers' ICT self-efficacy in the context of government primary schools of Bangladesh. Analyzing the scores of self-efficacy level of teacher towards ICT integration, it can be said that they had more perceived self-efficacy about incorporating technology into lessons and managing ICT in classrooms, which has often been identified as a challenge by teachers in other studies (Alhassan, 2017; Kazan and ELDaou, 2016; Letwinsky, 2017). The sampled teachers felt comfortable to select appropriate technologies for instructions and use educational technologies and digital contents in effective ways to make a class more student-centred. These findings are in line with the findings of Henson (2001), Perkmen and Pamuk (2011) and Gilakjani (2013) studies which reported that teachers with high self-efficacy towards ICT integration may apply different teaching methods, digital content using a student-centred approach.

The study found that prior experience in the context of ICT was one of the sources of high ICT self-efficacy beliefs of the participants. These findings reveal that the more the teachers' level of knowledge about ICT, the more their self-efficacy. The finding are in line with the findings of Anderson (2006), Arslan (2012), Aslan and Zhu (2015),

Bandura (1997), Birisci and Kul (2019), Isman, Evirgen and Cengel (2008) and Paraskeva, Bouta and Papigianni (2008) which indicated that prior experience is one of the important sources of self-efficacy.

The study also found that sound technology, pedagogy, and content knowledge had a strong and positive influence on ICT integration in teaching-learning processes and served as an important source of ICT self-efficacy. Having proper pedagogical understanding and communicating skills of concepts using technologies helps a teacher to apply ICT appropriately to teach content with a variety of ways according to students' learning needs. The finding is in line with the findings of Malik, Rohendi and Widiaty (2018) and Mishra and Koehler (2006) which indicated that sound Technological Pedagogical Content Knowledge (TPACK) is needed to integrate ICT in teaching learning processes.

The study found that teachers' self-efficacy could be enhanced through the capacity-building programs including in-service training on ICT and revealed it as a potential source of ICT self-efficacy. In-service training would enhance the teachers' self-efficacy by increasing content mastery and equipping with new pedagogical skills. The finding of the current study, therefore, is that teachers' self-efficacy can be enhanced by capacity-building programs involving in-service and counselling services. This is similar to Berghe (2010), Bluestone et. al. (2013), Bunyi et. al. (2013), Dube, Nhamo and Magonde (2018), Hughes and Kinder (2007), Mshila (2012), Murphy and Greenwood (1998), Shahmohammadi (2014) and Tondeur et al. (2012) which had found that capacity-building programs including in-service training and workplace counselling services enhanced workers self-efficacy.

The study found that quality support for ICT integration served as one of the sources of ICT self-efficacy as majority participants stressed the importance of support from different tier including school for effective ICT integration. These findings reveal that the higher the support for using technology, the higher the individual's self-efficacy beliefs. The finding was in line with the findings of Higgins and Compeau (1995), Raphael and Mtebe (2016) and Strudler and Hearrington's (2008). According to the respondents, school is the main tier of support for ICT integration including positive environment, attitude of the head teacher and staff and the leadership styles. These findings appear to support partially the findings of Schiller (2003), Seyal (2012) and Yuen, Law and Wong (2003) which reported that the key element in successful ICT implementation is the perspective of the headmaster and their staff. Besides, head teacher's leadership styles including appreciating teachers, delegating works, giving freedom was found to raise teachers' ICT self-efficacy. This finding is similar to Hardman (2011), Jankingthong and Rurkkhum (2012), Nkirote (2013), Odanga, Raburu and Aloka, 2018 and Tabu (2012) which found that teachers' ICT self-efficacy was richly affected by leadership styles.

7. Recommendations

Based on the above findings, some recommendations are made for policy, practice and future research:

7.1 Recommendations for Policy

- Policy makers need to include professional development programs on ICT for all teachers including head teachers to provide a sound understanding of the TPACK framework. Such trainings may employ both theoretical and practical aspects of using ICT at school level. This may lead schools to proactively initiate ICT integrated education and foster motivated teachers. It is suggested that when planning teacher training programs, the priority should be given to school-based training. Activities may employ various types of exercises and practices promoting peer-learning and sharing such experiences.

- There is a need to identify the level of teachers' self-efficacy towards ICT integration during the ICT in Education training and attempts could be made to maximizing self-efficacy, which probably could contribute to integrate ICT effectively in primary education of Bangladesh.

- Besides this, ongoing technical and educational support at school levels and recognition can boost teachers' ICT self-efficacy. So, the policy makers need to ensure continuous quality support and recognition to make teachers more confident and more competent to integrate ICT in teaching learning processed.

7.2 Recommendations for Practice

- Head teacher should articulate a rational school vision including ICT integration and demonstrate his/her robust commitment to the vision through role-modeling integrity as it emotionally affected teachers' self-efficacy to a great extent.

- Head teacher should provide a supportive environment which arouse and encourage creativity innovation and problem-solving skills by allowing team's independent thoughts rather than traditional as it not only affected teachers' ICT self-efficacy but also made them committed to the schools.

- Head teacher should be very concerned about teachers' needs for ICT integration and should take initiatives to meet their needs as this approach promoted their wiliness and enthusiasm to integrate ICT in classrooms. There is also need to praise and reward on their performance to keep teachers' self-efficacy vibrant as rewards was found as a determination of self-efficacy.

7.3 Recommendations for Further Research

- A similar research should be conducted in different districts in the country using different methodology considering all types of institutions of primary education rather than only government primary schools to enhance the generalizability of the findings.

- A study should be conducted to determine the impact of different variables (e.g., age, gender, qualifications, experience, salary structure and training program) on teachers' ICT self-efficacy.

- For future research, it is suggested that data should also be gathered from multiple sources (e.g., head teachers, parents and students) considering different context (e.g., urban, suburban rural and other geographical areas) to enhance the validity of the findings of the study.

8. Conclusion

Despite the robust policies and pledges to promote ICT integration in primary education of Bangladesh, steep challenges still exist and impede progress. On this ground, the study looks at the ICT integration in the teaching-learning process through the lens of teacher's self-efficacy. The study draws attention to the key sources of teachers' self-efficacy towards ICT integration in government primary education of Bangladesh. Some teachers with high ICT self-efficacy have been interviewed and the sources of their ICT self-efficacy are highlighted. The evidence suggests that prior experience of ICT skill, sound technological pedagogical content knowledge (TPACK), capacity building programs and technological and educational support have a key role to play in developing a high level of teachers' confidence and competence towards ICT integration which, in turns, can lead to an improvement of teachers' ICT self-efficacy.

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