

Teachers Perceptions Towards the Challenges in Teaching of the Revised Science Textbooks (RSTBs) at Primary Schools in Pakistan

Aqil Nadir Ali, Bureau of Curriculum, Education Department, Government of Balochistan, geniusstar222@gmail.com

Ali Nawab, Department of Education, Sukkur IBA University, ali.nawab@iba-suk.edu.pk

Gulab Khan Khilji, Bureau of Curriculum, Education Department, Government of Balochistan, gulabkhilji@hotmail.com

Nazir Ahmed Jomezai, Education Department, Government of Balochistan, nazeer_khan53@yahoo.com

Abstract: The purpose of this study was to investigate the teachers' perceptions towards the challenges they face in teaching Revised Science Textbooks (RSTBs) at primary level schools in Pakistan. The study used qualitative case study approach bounding the case to Quetta City. Using random sampling procedures, ten teachers (five males and five females) were selected from ten schools of Quetta city. The researchers used semi-structured interviews and reflective journal to generate data. Findings of the study revealed that the teachers were not trained to teach the RSTBs and consequently, majority of them were not familiar with the curriculum objectives and the new scientific terminologies. Moreover, the teachers' lack of subject knowledge and pedagogy has created critical issues in the understanding and delivery of the scientific concepts. Coupled with the above challenges, teachers at primary level were expected to teach all primary level subjects. Resultantly, these teachers were unable to concentrate only on Science subjects. To make educational reforms contextually relevant, the study recommends involving relevant teachers while introducing any initiatives or shifting practices including revisions in the textbooks. Moreover, teachers should be properly oriented and capacitated to successfully implement any reform initiative.

Keywords: Challenges, Textbooks, Revised, Teaching Science, Teaching

INTRODUCTION

Before the 18th amendment in Pakistan's constitution passed in 2010, the administration of public education in the country was partially centralised. The Federal Ministry of Education was responsible for formulating policies, national plans, curriculum standards, standards of education and budgeting. After the amendment, education has become a provincial subject. It reflects that the provincial education department will deal with policy matters. In response to the changes in policy and planning, the Secondary Education Department Government of Balochistan, at the first step, under the Policy, Planning, and Implementation Unit (PPIU), developed a five-year education sector plan (BEP, 2013-2018). The plan contains various themes like access and equity, quality education, higher education, and literacy through non-formal education.

Apart from all the other thematic areas, the quality theme contains curriculum, textbooks, teacher education and assessment. The area of the curriculum comprises its development, review, and dissemination. Similar is the case with the development of textbooks that are in line with the curriculum guidelines. Teacher education focuses on the teachers' capacity building to equip them with updated knowledge and skills to meet curriculum learning outcomes.

In pursuit of the 18th amendment and the subsequent development of BEP, the provincial Government of Balochistan adopted the National Curriculum 2006 (NC-2006) before developing a provincial curriculum as a time taking exercise. In line with NC-2006, new textbooks have been developed commencing from 2012. The newly developed textbooks are used in all the government schools and some private schools of the province. Generally, the curriculum, a "plan for learning" (Taba, 1962, p. 11), is not being used in teaching directly but through the curricular materials, mainly textbooks. The representation of curricular objectives through the textbooks is a common practice in Pakistan, similar to most countries around the world.

Several research studies have been conducted regarding the textbooks in the context of Pakistan, including Balochistan province. Most of them, however, are related to the other subjects' textbooks such as the English for primary school teachers (Panzai & Channa, 2017), evaluation of

English textbooks (Aftab, 2011), and textbooks evaluation through quality indicators (Mahmood, Iqbal, & Saeed, 2009). On the contrary, only a few research studies focus on the development, instructional use, and evaluation of science textbooks. Consequently, causing the scarcity of research in this regard and transpire limited interest and negligence of science from the researchers, academia, and educationists in Pakistan (Mohammad & Kumari, 2007).

Teachers' role is phenomenal in the instructional use of textbooks and other learning material. This study, considering the pivotal role of teachers in implementing RSTBs, remains significant and timely for two reasons. First is knowing teachers' perceptions of the challenges in teaching the RSTBs at primary schools. It will help highlight RSTBs' implementation through teachers' views who have a crucial role in its instructional use. The challenges they highly will be very much relevant, logical, and foremost crucial in knowing the actual issues hindering the implementation of the RSTBs. Second, this remains significant in informing the teachers' responses after being practically engaged in using these RSTBs, which remain a potential research gap. This research is an effort to fill in that gap and inform research about the future directions concerning the evaluation of science-related textbooks and learning material. Additionally, the study provides empirical evidence the policymakers may use in making informed decisions concerning the development and implementation of RSTBs in schools in Pakistan and elsewhere.

The study has the following research questions:

1. What are the challenges the primary school teachers' in Pakistan face while implementing Revised Science Textbooks (RSTBs) in their schools?
2. What suggestion the primary school teachers offer to overcome challenges concerning the implementation of RSTBs.

LITERATURE REVIEW

It is not easy for a teacher to select the teaching strategies out of numbers lying out there since every strategy needs to be applied through different approaches for different purposes and in different situations. There are some teaching strategies identified in different research work for various grade levels and purposes. An effective teaching strategy that can equally be used in other subjects is involving students in active learning through hands-on activities. A study conducted by Naylor, Keogh, Downing, Maloney, & Simon (2007) found that students' active involvement plays a more significant role in enhancing their understanding and reasoning skills at the primary science level. These authors further argue that shy and reluctant students may also participate in scientific discussions and argumentations with their fellows and teachers if involved in active learning activities. Argumentation and reasoning are the basic skills in science lessons to be promoted for problem-solving. Adding to the existing research findings, these authors described teachers' strategy of using questions for students' involvement and asking recall questions from them. A teacher's challenge in engaging students in active learning is that planning and implementing such activities require sufficient time from teachers that they may not afford given their time constraints. It has also been observed that classrooms, especially in developing contexts, are too overcrowded to engage students in active learning activities.

Another teaching strategy commonly used in teaching Science is the inquiry approach, an effective teaching strategy based on student-centered instructional procedures. The components of the inquiry approach include identification of questions or asking questions for further investigation from the relevant subject, making hypothesis for the question, identifying the relevant research experiment and preparing a plan, conducting an experiment, analyzing the data gathered from the experiment and meaning-making, and finally writing the conclusion of those findings (Pintó & Couso, 2007). Previous studies showed that engaging students in the inquiry have helped enhance their learning as they could demonstrate their learning for constructive outcomes. The

suitable environment played a significant role in the inquiry teaching strategies that stimulated learners' analytical, synthesis and interpretational capabilities (Karakoc & Simsek, 2004; Pintó & Couso, 2007). In a way, it leads towards gaining problem-solving skills where processing and output skills are fundamental for the development of analytical, comprehension, inferential and evaluation capabilities (Pizzini, Abell, & Shepardson, 1988). The development of thinking skills automatically leads to students reasoning abilities. The science classroom is, in fact, a laboratory that helps and provides the students' opportunities to improve their thinking skills that are the base of the future and must be worked on (Pizzini, Abell, & Shepardson, 1988).

However, planning and implementing inquiry-based teaching is a big challenge for teachers. As the experience suggests, teachers cannot use inquiry-based teaching in many developing contexts due to their capacity limitations (ref). The pre-service training, they undergo usually focuses on theory without providing teachers with practical skills to use inquiry-based teaching (ref). Similarly, as (ref) argue, the examination system usually assesses students' rote learning ability, lacking any value for inquiry-based learning. Instead of engaging students in such activities, the school system expects syllabus coverage, which compels teachers to do more through lecture methods.

Literature also reveals other challenges teachers face in the teaching of science at different levels. Some of the studies are related to the challenges of science teachers in their teaching of the revised curriculum, including unveiling the difficulties implementing science curriculum in countries like Portugal, Kenya and Tanzania (Vasconcelos, Torres, Moutinho, Martins, & Costa, 2015; Okoth, 2016; Makunja, 2016).

All these studies have found some similar challenges of teachers in curricula implementation. These included the lack of teachers professional development, lack of curricular materials or resources, the load of textual content and complexity, students' lack of interest in learning Sciences, and absence of any specific guidelines to incorporate teaching strategies (Okoth, 2016);(Makunja, 2016; Vasconcelos, Torres, Moutinho, Martins, & Costa, 2015; Vasconcelos, Torres, Moutinho, Martins, & Costa, 2015; Okoth, 2016). The studies inform about the teachers' various difficulties in the use of textbooks, particularly of science. Accordingly, as in science textbooks, the textual material has mainly two main aspects that hinder effective teaching and learning processes. The first is textbooks' different dimensional impacts, including their scientific vocabulary, reading comprehension of the text, questions, illustrations and teaching strategies for these dimensions. Second is the external aspects of the unavailability of teaching and learning resources and lack of time, which hinder its practical use.

All these factors influence the teaching of Science negatively. The studies showed that the scientific vocabulary is loaded with textual material that hinders the students' scientific understanding and reading comprehension of scientific texts. Indeed, the end of chapter questions did not cater to students' level of learning as most of these lies at the lower level that assesses the students' knowledge only rather their higher order thinking and application of their learning. Likewise, the illustrations vary in numbers and styles of presentation. These not only depict the natural features of science but also explain the several components and procedures. However, the lack of usage and practices by teachers have also been evident previously. (It is not clear whether it is researchers' own views or the results of the previous research. It is necessary to let the reader know that which particular study informs about these challenges).

The studies conducted in Pakistan have revealed the reduced focus and interest of both the government and educationists towards scientific development, such as the effective use of textbooks. For example, Mohammad & Kumari (2007) investigated the challenges related to using textbooks in rural Pakistan. Their study revealed two significant aspects: one is the 'limited access to the information given in the textbooks where limited access points towards the gaps occurred in the text due to the textual material's language difficulty or any other aspect. The second one is the teachers' 'limited use of textbook content' where limited use of textbook content refers to the

minimum use of textual and illustrated information of textbooks by the teacher in such a way that they exempt the experiments given in textbooks and the reason the unavailability of materials or their lack of understanding to perform experiments. As a result, effective teaching failure occurs that shows the teachers lack planning and reading the text before the teaching.

In the other study, Nadeem, Sadaf, Parveen, & Iqbal (2013) worked on the representation of Science in Curriculum-related primary school textbooks through the content analysis of the Punjab Government's primary textbooks. The study unveiled that the primary level textbooks have not achieved the required level of science representation. Moreover, the proper understanding of the scientific concepts has not been developed because of the lack of illustrations, inappropriate information, and less science teaching. This gap has made the content understanding difficult for the teachers and causes misconceptions among the students after teachers' interpretation.

Literature (e.g., Vasconcelos, Torres, Moutinho, Martins, & Costa, 2015) also suggests specific ways to address teachers' challenges in science teaching. One recommendation is to provide opportunities for the teachers to participate in the development and or review of the curriculum to have an integrated approach to the ground realities and classroom practices concerning the science curriculum. Secondly, the teachers need to be trained on a regular basis to enhance their capabilities in teaching strategies that are need-based and specifically address the new interventions related to curriculum implementation, such as the implementation of RSTBs by the government of Balochistan. The teachers' capacity building was not the only solution; rather, reorganizing and restructuring the pre-service teachers' course was also required.

METHOD

Qualitative approach was used to have a deeper analysis of the phenomenon under study (Neuman, 2014). The qualitative approach enabled the researchers to personally communicate to respondents and develop concepts based on their experiences and views (Pope & Mays, cited in Nigatu, 2009), within a specific sociocultural setting (Neuman, 2014). The researchers used an exploratory case study approach to explore the perceptions of teachers on challenges faced while teaching RSTBs. The case was bound to Quetta City, as the provincial capital of Balochistan, and teachers teaching the RSTBs at primary level remained the respondents of the study.

Samples for this study were drawn from 10 schools including 5 boys and 5 girls as "there is no rules for sample size in qualitative inquiry" (Patton, 1990, p. 184). A teacher of primary class - teaching RSTBs, from each selected school was recruited as a participant of the study forming 10 primary school teachers as participants. The participating teachers were accessed with the approval of the relevant authorities, after obtaining a list of primary schools from the Balochistan Education Management Information System (BEMIS). The respondents were informed about the purpose of the study and their consent was obtained.

Semi structured interview was the main instrument to generate data from teachers. In fact, at the core of "in-depth interviewing was an interest in understanding the lived experience of teachers and the meaning they make of the experiences concerning the implementation of RSTBs (Seidman, 2006). The research participants' context was of Urdu speaking language. That is why, the interview protocol was translated into Urdu so that questions are asked in the same language they understand.

The teachers were interviewed individually, and each interview was of 40 to 60 minutes. All the interviews were audio recorded which allowed to go back to the data whenever required (Silverman, 2005). Besides interviews, a reflective journal was also maintained for the critical incidents and issues that took place during the study as well as documented the development of emerging thoughts. The recordings of these critical incidents in the reflective journal guided the research work and processes (Ortlipp, 2008). The reflective writing was managed with the flow of research work and made part of the research findings.

For the purpose of the data analysis thematic analysis was employed where initially, the interview data was translated and transcribed on a daily basis with the assumption that the data recorded and the researchers' information gathered were fresh that can be easily remembered during the transcription. The transcribed data were then read several times and then coded roughly. Once coded, a rough pattern was found among those codes. The identification of themes was initially done on the basis of the emerging patterns and their relationships. After careful review and checking, each of the category was titled based on the information appearing in that. Again, the reviewed categories or subthemes were revisited and based on the relationships, the similar subthemes were grouped as one major theme as these themes naturally emerged from the data building upon evidence (Neuman, 2014). Through the continuous process of re-examining the data, categories or subthemes, themes were modified where necessary and then finalized.

FINDINGS

Upon analysis of the data, the following themes and their subthemes emerged,

Instructional Strategies and Teachers' Challenges

This central theme includes the following subthemes, a) Teachers' subject matter knowledge, b) teaching aspects such as teaching strategies, instructional materials/ scientific equipment/ apparatus, and course completion timelines, and c) school-related contextual factors. Data on these themes are presented and interpreted below.

Teacher Subject Knowledge

Teachers' subject knowledge was a significant component that frequently emerged. The majority of the teachers thought that RSTBs were difficult for the primary level schoolteachers to teach. One of the teachers said that "the primary school teachers do not possess required qualifications. The qualification of most of them is only secondary school certificate. Some of them may have acquired higher academic qualification as private candidates in the later stages of their career, mostly motivated by financial incentives added to their regular salaries. That is why they do not have a strong background in science".

With the qualification of only a secondary school certificate, some teachers shared that they have studied art education, but they must teach science subjects due to lack of subject-specific teachers. Whereas those with secondary school certificates in Science; had to study exclusive subjects for Physics, Chemistry, and Biology. In other words, most of the teachers do not have the required subject knowledge. Another teacher expressed that "the teachers appointed 20 to 25 years ago based on their middle-level qualification have not been in a position to improve their understanding of the update science content (From the feedback journal of a teacher).

It was revealed that the Head/Principal of a school assigns subjects to teachers. One female teacher said that "sometimes the subject is assigned to the teacher who does not know the subject. Therefore, it becomes difficult for her to teach. Furthermore, primary level teachers have to teach not only the science subject but also the other subjects". In this regard, another teacher shared that "now if we know then we can teach". Another female teacher was of a similar point of view and said teachers lacked exposure to science teaching. Whenever teachers face any difficulty teaching the scientific content and RSTBs, they discuss their problems with the senior colleagues or the subject teachers (in high-level schools).

Considering the weak subject knowledge of primary school teachers, most teachers emphasized the teachers' training focusing on the science content. Some teachers suggested that the teachers teaching science subject should update their subject knowledge through self-studying textbooks for grades one to ten or concerned books before teaching to students. Teachers also shared that "when they teach the subject time and again, they become good at it and develop the

confidence to teach that subject very well". Thus, the teachers regularly teaching a subject help them improve their subject knowledge.

Teaching strategies

Knowing how to teach and doing it is another significant skill and part of teacher knowledge. A teacher shared, "transferring of knowledge depends on how teachers teach". Some of the interviewed teachers were of the perspective that teachers do not know teaching science, particularly RSTBs. Another teacher expressed, "this is because the teachers by themselves do not know how to teach these RSTBs. He further said, "Now student learning outcomes are given at the beginning of every unit. None of the teachers knows why these are given and how we have to use these in teaching".

Most teachers' teaching strategy is to read out the content a few times and make students do the same. After reading the text, teachers solve questions given at the end of the chapters. A female teacher shared that "once we read and explain them, they read it to make them develop their understanding". A male teacher shared a similar perspective: "we just read the lesson and complete the course".

It was found that some of the teachers had similar teaching methods for the terminologies. They mostly read aloud the terms first and shared their Urdu meaning. Another female teacher said that "we read aloud and then we explain them or tell students the Urdu meaning (or the Urdu words for the term) than students understand". In some cases, teachers even tell the students the terms in their local languages or mother tongue. A female teacher shared that:

We make the students know the term in their mother tongue first and make them know its meaning in Urdu and English. In some cases, students with different mother tongues also help us by telling the terms used in their languages.

Besides teaching terminologies, various other teaching methods were used by teachers who used the blackboard to draw models to explain and demonstrate activities with the help of available scientific materials given in the RSTBs. While some male teachers use the available materials to perform activities and use daily life examples to enhance students' conceptual understanding. A female teacher shared that "if models are shown, then it would be easy for students to understand". Whereas most "the students, even the children who do not speak, can easily respond and participate when models are used" (from a teacher's feedback journal). However, some teachers use lecture responding with discussions and questions and answers.

Before teaching, most of the teachers prepare themselves for lessons by reading the topic to teach. For example, they do a self-study of the textbooks before teaching. Additionally, some of them discuss with colleagues if they find any difficulty understanding and teaching the topic. A teacher, on the other hand, was of the view that,

The students are forced to learn advanced concepts without making the basics clear to them. Rather than understanding the concept, they memorize the new concepts. When asked about a specific topic, most students cannot explain it to them because the teachers are not trained.

All the above examples suggest that teachers barely use the strategies found effective in the teaching of Science as presented in the literature section. The major hindrance, in this case, seems to be a lack of both content and pedagogical knowledge. The low academic background and the reduced access to quality professional development have resulted in increased challenges for teachers when confronted with the revised Science textbooks.

Instructional Materials/ Scientific Equipment /Apparatus

To perform the activities in the teaching of Science, one needs to have some specific materials or equipment relevant to that activity. In this regard, most teachers found difficulty doing activities as there were "no scientific apparatus" (from a teacher's feedback journal).

In some cases, secondary level schoolteachers use scientific equipment in teaching as they easily access those materials from the laboratory. On the other hand, the primary-level schools could not perform such activities due to the laboratory's non-existence and the availability of material. However, a female teacher viewed, "it is not necessary to have equipment from labs one can easily use materials from the surroundings". Some teachers involve their students to collect no-cost materials for the activities to be performed. Another female teacher said that "we ask students to bring materials from their homes if available". Nevertheless, another female teacher said, "sometimes it becomes difficult when we cannot find the object mentioned in the textbook such as microscope". Subsequently, in the absence of scientific apparatus, "activities are done by oral presentation, drawing, and/or labelling" (Another teacher).

Since most of the teachers were facing challenges to perform the activities, it was suggested that scientific equipment be provided to them. Particularly the availability of the ones related to the activities given in RSTBs was highly demanded. They proposed the provision of required material and a separate room in each school for this purpose.

Thus, the non-availability of scientific equipment was a massive challenge for teachers to explain the new concepts to the students. Although these concepts required a number of materials as suggested in the curriculum, schools lacked those materials. Consequently, there was a gap between what had been suggested in the revised curriculum and what was available to the teachers in the actual context.

Course Completion

There were various perspectives of teachers on the course completion. According to a female teachers' point of view, some teachers skip activities given in the Textbooks to complete the course content. She further stated that it was possible to complete the given syllabus within the given academic year. Similarly, another female teacher said that previously there was difficulty completing the course, but due to syllabus breakups, it became easy to complete the course. It also allows for revision of the course content.

Contrary to female teachers' ideas, some male teachers believed that course completion within a specific duration is challenging. They highlighted that additional time is required for completion of the course while following activity-based teaching. They were also concerned about the completion of students' notebooks given the limited time. Similarly, a male teacher found it challenging to complete the science course within the allocated timeline in a class with many students with various learning capabilities. One of the teachers claimed that "The pressure of course completion by the school inspection team had an impact on the effective delivery of the scientific knowledge". He expressed that "on the day of inspection it was asked whether one had completed the course or not. So, teachers just focus on completion of the course so that they can share on the day of inspection". Thus, teachers are challenged mainly by the change in textbooks and time allocated to achieve effective teaching and learning.

School Management

School as an institution has a substantial impact on effective teaching and learning as there are many tasks that an individual teacher cannot accomplish. Teachers' knowledge, such as content and pedagogy, can be mediated by the school system, school head, and education officials. In this respect, most teachers shared that the high schools' head allowed the primary level teachers to discuss their subject content and teaching-related issues with their subject expert colleagues. Secondly, the provision of reference books related to the school subjects also helped teachers clarify any related confusion. Consequently, school management either facilitates or hinders teachers in teaching the revised textbooks.

Teachers were also assigned various subjects at the primary level by the school management. Teachers believed that a school head could assign only Science subjects to a teacher

instead of engaging them in teaching all the subjects. The teachers also believed that a subject specialist might be assigned to teach the primary level Science in primary level sections of a high school. Teachers were making this suggestion assuming that primary level Science has many complex concepts that can be clarified to students by an expert and subject specialist teacher. However, this will happen if the school leadership considers the situation and takes action accordingly.

Similarly, the scientific materials lacking in the schools, as highlighted earlier, were also under the school heads' jurisdiction. They have the authority and capacity to facilitate teachers with those materials. However, as reported by the teachers, some of the school leaders take reduced interest in providing those materials. It suggests that school leadership has a tremendous role in influencing science teaching at the primary level. Thus, effectively teaching the revised textbooks is also dependent upon the role of the school management.

Suggestions for Improvement

The teachers suggested some ways to address teachers' issues and improve the teaching of revised textbooks. The major shift they recommended was Training. Teachers were of the view that the implementation of RSTBs required teachers' prior capacity building. Teachers showed their concern stating that the science textbooks have been revised and used by the teachers, but no training has taken place. For the said purpose, all the teachers recommended training, workshops or orientation sessions for the teachers who teach RSTBs. A teacher believes "training should be mandatory". It was also revealed that the one-time training might not be that effective. In this regard, a teacher suggested, "An effective training strategy is the one where teachers are supported in the workplace by classroom observations, feedback and mentoring.

Though the textbooks have been completely changed, the teachers need support both in content and pedagogy. In this regard, a teacher suggested that "during the training, the facilitators need to emphasize the new concepts added to the textbooks". Most teachers emphasized the importance of content and suggested focusing on content while devising capacity building plans. However, some teachers were also in favour of the pedagogical aspect of RSTBs. These teachers viewed that without pedagogy, content may not be delivered effectively to the students.

The study's findings also suggested some of the ways for when, how, and whom to train. It was revealed that often the relevant teachers are not selected for training. For example, a teacher revealed that an English teacher is nominated for Science training. Secondly, the training schedule during the schools' days impacts the students' learning time, so a teacher suggested conducting training "during three months of winter vacations as schools are closed during those days, and teachers can easily participate in training". Thirdly, from a school, training of all teachers is not possible in one go so that various strategies may be used in training teachers. A teacher suggested that "Few teachers may be selected initially for training and later, those teachers may train their colleagues in the same schools". Lastly, another teacher suggested that "the teachers should also be provided with a kit that should have materials for the activities to be done".

DISCUSSION

This study found that most of the interviewed teachers were less familiar with the teaching strategies for the RSTBs mainly because most of them were not accustomed to the given student learning outcomes (SLOs) and their interpretations in teaching learning process. Reading the text time and again and explaining it to the students were used as the common teaching strategy. Although some teachers were found using some no-cost teaching materials to clarify concepts to the students, majority of the teachers were depending only on the textbooks. Lack of content knowledge, pedagogical knowledge, time constraints and the lack of the resources were common challenges faced by the teachers hindering the effective teaching of the revised textbooks.

The effectiveness of teaching has closely been linked with the capacity of teachers. The capacity of teachers in this context was questionable mainly because of their low academic background. Teachers, especially the senior ones, have been recruited based on their secondary level qualifications who lacked any university level major in Science resulting in their limited ability to plan and teach effectively (Stern & Roseman, 2004). Though the textual materials are much of the help for those teachers in their content knowledge. Still, as earlier studies have suggested, teachers would not teach the chapters or content that they themselves were not familiar with. Our analysis suggests that the teachers' limited understanding of the scientific concepts and limited pedagogical content knowledge (PCK) did not allow them to make sense of the information or activities provided in the textbook (Mohammad & Kumari, 2007, p. 7).

On the other hand, teachers lacked autonomy to carry out teaching plans and strategies at their own will and pace. Teachers felt bound to and obey the decisions taken by the institutional heads such as the headmaster or headmistress. In that circumstances, they had to teach all the assigned subjects which may not be related to a specific discipline. In some cases, they were supposed to teach a subject for one year and then to shift to another one. Switching back and forth to the subjects had not allowed them to get expert in the assigned subject. Nevertheless, it was encouraging to note that in some of the schools, senior science teachers or science subject teachers helped novice teachers in addressing their conceptual confusions. However, it was also found that some senior teacher considered helping junior teachers beyond their jurisdiction (Greenleaf, Schoenbach, Cziko, & Mueller, 2001). The findings also supported previous studies (Mohammad & Kumari, 2007) that Science teachers did not perceive textbook as an important teaching and learning resource. They reasoned the training programs conducted for teachers encouraging them of thinking 'beyond the textbook' the alternative ways of the teaching process.

Another key challenge that teachers faced was the lack of instructional materials or scientific equipment for the activities to be performed in classrooms. Most of the teachers avoided demonstrating activities in the classroom. Unlike those, some of them managed the resources through the available materials in their surroundings and with the help of their students which they used in their teaching learning process. Yet there is some apparatus like microscope and chemicals that cannot be arranged by the teachers. This issue has already been highlighted by Mohammad and Kumari (2007) who criticise the author of the curricular materials for ignoring teacher's contextual limitations in the form of "non-availability of such materials in rural contexts where even basic living facilities could be scarce" (p.8).

Though the majority of teachers were unfamiliar with the teaching strategies of the RSTBs, some of them tried to manage doing activities given in the textbooks with the help of the available materials and the students. Thereupon, the effective teaching would occur as a result of the proper training of teachers in pedagogy and the inclusion of the activities requiring the use of easily available materials within a specific context. In this background, teachers suggested two main areas of teachers' training and textbooks. Firstly, before any interventions, the teachers need to be involved in the review and development of the curriculum and its curricular materials (Makunja, 2016; and Vasconcelos, Torres, Moutinho, Martins, & Costa, 2015), in order to have an integrated way of the classroom practices and realities. Secondly, teachers training should be done on regular basis in terms of both the content and pedagogy. These training require to be need based focusing new interventions. It suggests that some changes through reorganization and restructure of pre-service teachers' course may also be done (Vasconcelos, Torres, Moutinho, Martins, & Costa, 2015). In addition, teachers support materials as of teachers' guide and CDs or DVDs may also facilitate the teachers in absence of training.

Teachers also recommended multiple suggestions regarding the improvement of the RSTBs. Firstly, the scientific terminologies have to be written in English instead of Urdu version. This is because there is not any use of the Urdu version of the terms in the long run. Also, these Urdu

versions of the scientific terms do not represent any language or improve any language. So, it is better to avoid using the Urdu version and save time to learn the terminologies in English.

IMPLICATIONS

The findings of this study have implications for the teachers, teacher educators, curricular material developers, curriculum reviewer and developers and the policy makers.

The implication for teachers is that they should not only teach the reading of curricular materials but also prepare before teaching class either with the help of their colleagues or review the content and pedagogical skills by themselves. Secondly, the teacher educators and teacher educational institutions such as Provincial Institute of Teachers Education (PITE) and all the Elementary Colleges can focus and prepare training schemes for the trainings of these teachers. Since these educational institutions cater both the pre, and in-service teachers' professional development, the review and improvement of the training courses can also be made according to the new interventions.

Thirdly, the curricular materials or textbooks developers and curricular material developing institution as of Balochistan Textbook Board (BTBB) may use and incorporate the recommendations and feedback given by the teachers for further review, development and improvement of the RSTBs. Also, the author of the RSTBs must consider the contextual realities regarding the materials availability so that teachers in any part of the province may equally benefit. Curriculum reviewing and developing custodian institution such as Bureau of Curriculum and Extension Center (BOC & EC) may work for further improvement and changes of curriculum according to the suggestions provided by teachers.

Lastly, policy makers may review their recruitment policies regarding recruitment of the primary school teachers specialized in a subject specific particularly in science. Also, for the teachers to enhance their content knowledge related to their subjects, further opportunities may be provided. Finally, the relevant subject teachers may be asked to teach the related subject instead of any teachers specially for the science subject.

CONCLUSION

The study showed that teaching RSTBs increased teachers' challenges because most teachers did not acquire the required capacity to teach the revised content. They could not grasp the concepts and their alignment with the learning outcomes consequences upon their professional incapacity and unfamiliarity with the curriculum objectives. Teachers' lack of pedagogical content knowledge has created critical issues in understanding and delivering scientific concepts. For the RSBTs or any such kind of interventions to be successful, it is essential to ponder and prioritize its relevancy in terms of context and relevant teachers' involvement. Moreover, teachers should be oriented appropriately and capacitated to implement any reform initiative successfully.

REFERENCES

- Aftab, A. (2011). English Language Textbooks evaluation in Pakistan. Retrieved from <http://theses.bham.ac.uk/3454/1/Aftab12PhD.pdf>
- Balochistan Textbook Board. (2017). Textbooks Information. Quetta.
- Gioko, A. K. (2007). Qualitative Explorative Study of Science subject leadership in the enhancement of information communication technology (ICT) integration in project-based learning (PBL) in a private secondary school in Pakistan. Unpublished Master's thesis. Karachi: Aga Khan University.
- Karakoc, S., & Simsek, N. (2004). The Effect of Teaching Strategies on the Usage of Learning Strategies. *Educational Sciences: Theory & Practice*, 4(1), 124-129.
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. New Delhi: New Age International (P) Limited.

- Mahmood, K., Iqbal, M. Z., & Saeed, M. (2009). Textbook Evaluation Through Quality Indicators: The case of Pakistan. *Bulletin of Education and Research*, 31(2), 1-27.
- Makunja, G. (2016). Challenges Facing Teachers in Implementing Competence-Based Curriculum in Tanzania: The Case of Community Secondary Schools in Morogoro Municipality. *International Journal of Education and Social Science*, 3(5), 30-37.
- Mohammad, R. F., & Kumari, R. (2007). Effective Use of Textbooks: A Neglected Aspect of Education in Pakistan. *Journal of Education for International Development*, 3(1), 1-12.
- Nadeem, M., Sadaf, B., Parveen, A., & Iqbal, S. (2013). Representation of Science in Curriculum related Primary School Textbooks. *Asian Journal of Social Sciences and Humanities*, 2(2), 380-387
- Naylor, S., Keogh, B., Downing, B., Maloney, J., & Simon, S. (2007). The Puppets Project: Using Puppets to promote engagement and talk in science. In M. Kipins, & A. Hofstein (Eds.), *Contributions from Science Education Research* (pp. 289-296). Dordrecht, The Netherlands: Springer.
- Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches* (7th ed.). Edinburgh Gate, Harlow, United States of America: Pearson Education Limited.
- Okoth, T. A. (2016). Challenges of Implementing a Top-down Curriculum Innovation in English Language Teaching: Perspectives of Form III English Language Teachers in Kenya. *Journal of Education and Practice*, 7(3), 169-177.
- Ortlipp, M. (2008). Keeping and Using Reflective Journals in the Qualitative Research Process. *The Qualitative Report*, 13(4), 695-705.
- Panezai, S. G., & Channa, L. A. (2017). Pakistani government primary school teachers and English textbooks of grades 1-5: A mixed methods teachers' - led evaluation. *Cogent Education*, 4(1), 1-18.
- Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed.). Newbury Park, CA: Sage Publications, Inc.
- Pintó, R., & Couso, D. (2007). Inquiring the inquiry laboratory in high school. In M. Kipins, & A. Hofstein (Eds.), *Contributions from Science Education Research* (pp. 297-306). Dordrecht, The Netherlands: Springer.
- Pizzini, E. L., Abell, S. K., & Shepardson, D. S. (1988). Rethinking Thinking in the Science Classroom: A thought-full curriculum. *The Science Teacher*, 55, 22-25.
- Seidman, I. (2006). *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*. New York and London: Teachers College Press.
- Silverman, D. (2005). *Doing qualitative research: A practical handbook* (2nd ed.). London: Sage Publications.
- Stern, L., & Roseman, J. E. (2004). Can middle-school science textbooks help students learn important ideas? Findings from project 2061's curriculum evaluation study: *Life science. Journal of Research in Science Teaching*, 41(6), 538-568.
- Taba, H. (1962). *Curriculum development: Theory and Practice*. New York, NY: Harcourt, Brace & World.
- Vasconcelos, C., Torres, J., Moutinho, S., Martins, I., & Costa, N. (2015). Uncovering Portuguese teachers' difficulties in implementing science curriculum. *Cogent Education*, 2(1), 1-12.