



Impact of Technology on School Leadership at Jakar Higher Secondary School, Bumthang

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Technology is indispensable in today's era and we have to think about how we can utilize it to create and impart effective leadership and learning in the schools. The essence of technology is strongly felt in education than ever before. The school leader who harnesses technology advances in every aspect and becomes a technology leader. Technology advancement is professional growth and it affects school leadership. The purpose of this action research was to find out the impact of technology on school leadership. The pre-test and post-test were carried out and data were analyzed accordingly. The questionnaire was categorized into three aspects such as communication, student learning, and administrative and managerial. The pre-test and post-test data showed a change in responses and the rating score on the questionnaire indicated the effectiveness of intervention strategies and the impact of technology on school leadership. The findings also show a significant positive correlation between technology and school leadership. It was found out that technology has a greater impact on school leadership, student learning and also amplifies communication skills.

Keywords: Administration; communication; impact; technology; school leadership; student's learning.

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1. INTRODUCTION

Jakar Higher Secondary School is in Choekhor geog under Bumthang Dzongkhag. It was established in 1961 and is one of the oldest schools in Bhutan. It is located on a beautiful undulating slope opposite Jakar Dzong and two kilometers away from Chamkhar town. The school occupies an area of 36 acres with Thram number 749. The school takes its name from the nearby Jakar Dzong. The school was established as a Government Secondary School on 25th September 1961 and in 1983 it was upgraded to a Junior High School. Further, in 1995 the Education Department upgraded the school to High School. With the increase in enrolment in the dzongkhag, the school was upgraded to a Higher Secondary School and offered Arts and Commerce streams. Later in 2004, the Science stream was introduced. With the policy of the Autonomous School concept in 2014, the school was granted autonomous status along with other 19 schools. As of today, the school has classes ranging from IX to XII. There are 745 students in the hands of 34 teachers and 24 support staff.

He joined this school as the Principal on 5th June 2017. Over time, the number of staff increased and the work pressure escalated. To sufficiently meet the challenges, he thought to leverage technology to perform better in overall school administration and management. The developmental pathway to career was to carry out action research to check the pulse of present leadership styles and improve further. The action research-driven leadership practices shall be relevant and professional. According to Corey "Action Research is defined as a process in which practitioners study problems scientifically so that they can evaluate, improve and steer decision-making and practice" (1953, as cited in [1]).

2. RECONNAISSANCE

2.1 Situational Analysis

It is his 20th year running in the teaching career and 12th year in School Leadership. In 2010, he had to take full responsibility as the school leader. His placement was at the remotest school, Nimtola Primary School, Dagana. It was the best school where he could display his leadership competency. Life was hard, however; he took it as an opportunity to serve to the best of his ability with the support of his colleagues, community, and students.

Since the school was established in 2006, students were all grown up and aged compared to other schools. They were devoid of school due to the remote location. He did fast track promotion in the mid-year and enrolled them to the next higher class as per the education policy. He had 8 teachers, three support staff, and 262 students. Leadership and management aspects were well-taken care of. The internet connectivity was very poor and at the same time, there was no electricity. His school works were all maintained in paper works and he corresponded to the stakeholders accordingly.

In early 2013, he joined Namchalla Lower Secondary School, Dagana. It was better than his previous school in terms of facilities. It was connected by road and electricity. The internet connectivity was also better and shortly they were facilitated with wifi. There were fourteen teachers, 284 students, and seven support staff. The internet connectivity was better there and he used it for corresponding to the stakeholders and maintaining records.

In mid-2017, he joined the present school. He underwent many differences at that time. Firstly, the school was a higher secondary school, secondly, the number of staff and students were higher compared to his previous schools, the area was larger and most importantly the school culture was strange to him. He found his attention scattered everywhere and not focused, eventually becoming his leadership challenging one. Therefore, this action research was intended to find ways to improve his leadership by leveraging technology.

2.2 Competence

He did his Bachelor of Education in English from the National Institute of Education, Paro in 2002. He had been in the leadership position since 2010 at different levels of schools such as primary, lower secondary, and higher secondary. Those experiences equipped him to grow as a leader, however his curiosity to find the impact of technology on leadership was felt with change in time and development.

He did his Master's in Leadership and Management at Paro College of Education. As a part of the fulfillment of his Master's program, he did conventional research and action research too. He attended the 505 module which was about carrying out action research.

He completed his Post Graduate Diploma in English from Sherubtse College, Kanglung, in 2009. He always reads books and tries to implement the new knowledge gained in his daily practices.

Besides, he attended training on Action Research at Gelephu organized by the Ministry of Education.

2.3 Research Questions

This action research aims to answer the following research questions:

Overarching question:

How can I improve my school leadership using technology?

Sub questions:

1. What is the present teachers' perception of technology of school leadership?
2. What are the current practices of school leader's impact on technology?
3. Would technology strengthen school leadership?

3. LITERATURE REVIEW

Literature supports the idea of the impact of technology on school leadership. What is becoming increasingly clear is the use of technology in education. In the technology-driven and technology-enabled world, there is a paradigm shift in school leadership as well.

Over the years, school leadership has become challenging and demanding with the broadening of the roles and responsibilities. The impacts of technology on school leadership shall ease the responsibilities and shall bear rich dividends. For instance, Kapur [2] highlights that the industrial age has transformed into technological age particularly in the learning process.

The school leadership has to leverage technology for high performance. For excellent performance, school leaders must make use of technology. Educational leaders (DEOs, TEOs, and principals) are critical to the success of any educational program in the classroom. One of the elements for effective adoption of Information and Communication Technology in education is their active support and thorough understanding of the values and benefits of educational

technology [3]. Furthermore, Education [4] asserts that an ICT-based educational management software increases the effectiveness of educational leaders in controlling and analyzing students' progress to provide quality and timely feedback. The capacity of school administrators to organize, motivate, and lead technology use in a school has a significant impact on ICT's educational performance. It demonstrates a thorough grasp of how technology may be used to improve the efficiency of an organization's operations and management.

Dias [5] states that understanding what defines best practices in technology integration is critical for school administrators and those in leadership roles. While principals may be willing to embrace technology, they require more individualized professional development to help them get there [6]. Principals who do not understand how to use technology as instructional leaders of the building will be unable to appropriately evaluate the use of technology by teachers for teaching and students for accomplishment. To stay current, administrators' skill sets must alter as technology advances [7].

The data suggests three progress in the use of technology for teachers and students [8], but there are not many studies on administrators' opinions. Furthermore, administrators as educational system leaders, it is critical to examine their technological knowledge bases and applications, as their perceptions and applications reflect their vision, organization, and planning.

Hughes and Zachariah [9] performed research to see whether leadership characteristics influence the use of technology to improve teaching and learning. The study looked at how the relationship changes as roles and responsibilities change. The leadership style of a school's principal has an impact on how technology was implemented. Teachers saw the principal's facilitative leadership as critical to effective technology deployment [10,11,9]. Administrators who embrace technology as a tool for cooperation and stimulation for real learning experiences might help students achieve considerably more than they have in the past [9].

New technologies, according to Hand and Vaughan [12], "contribute to a learning environment that is more responsive to an individual student's needs and interests" (p. 443).

The development, implementation, and continuous assessment of a whole-school strategy to adopting new technology was found to be a key technique for changing teaching, learning practices, and outcomes in their mixed-methods study. As they began to use graphic calculators, the Internet, Microsoft PowerPoint, and online conversation with these technologies, teachers, and students changed their views and attitudes about the nature and techniques of effective teaching and learning.

The utilization of technology as a teaching tool is a crucial learning tool, resulting in greater professional standing and recognition outside of the educational setting. As a result, the whole-school strategy met its aim of creating a more productive learning environment via the use of modern technology [13]. The implementation of educational goals and new technology relies heavily on planning and good principle leadership. The leadership of the school principals had a strategic technology strategy for emerging technologies and how they would be used in a school context. Principals and administrators of secondary schools should be informed of the latest technologies available for educational reasons.

Bell [14] examined principals' perceptions of technology's influence in today's schools in his dissertation. The study also sought to learn how principals perceive technology in their daily roles as school leaders in the twenty-first century. The goal of his research was to learn more about the role of technology in 21st-century schools, as well as the effects it has had on principals, counselors, instructors, and students. According to the findings, 62.3 percent of principals said that technology had a good influence on their jobs as administrators, on their schools, and teachers, counselors, and students. Over half of the 35.7 percent of participants who said technology harmed their campuses also said it harmed their responsibilities as principals. To offer successful leadership in their schools in the twenty-first century, school administrators must have a thorough awareness of the challenges and technological capabilities. They must effectively use technology in their roles as coordinators and communicators of school programs and activities [15].

According to Chin [16], technological leadership differs from traditional leadership theory in that it emphasizes that leaders should develop, guide, manage, and apply technology to various

organizational operations to improve operational performance rather than focusing on the characteristics or actions of leaders. As a result, technological leadership is a form of functional leadership. Furthermore, technology leadership refers to the use of leadership abilities by school leaders to assist their institutions in using technology in constructive ways and preparing their schools for the twenty-first century. It is critical to developing principals' technology leadership in the school; principals must serve as role models for successful technology leadership [17]. In the same vein, not only the principal but also the teachers should be competent in terms of technology integration in the classroom. Teachers, as the frontline educators, should embrace the use of technology in the classroom. According to Basitere and Ivala [18], the usage of technology can lead to deep and meaningful collaborative learning. Consequently, the team discreetly provided great performance and a strong understanding of technology. Furthermore, according to Hero [19], teachers demonstrate competency in how they incorporate technology into their classroom teaching and regard it as pedagogical innovation in the education paradigm.

3.1 Data Collection

Baseline data for this action research was collected through a questionnaire on how technology affects school leadership. According to Sukamolson [20], many types of data that aren't typically quantitative can be collected quantitatively. This is accomplished by developing research instruments that are specifically designed to turn phenomena that do not normally exist in quantitative form into quantitative data that can be statistically analyzed.

This method involved the experiment group to answer a survey questionnaire using a 5 point Likert scale with the following ratings: Strongly agree: 5, Agree =4, Neutral=3, Disagree =2, Strongly disagree=1 (Appendix A). Sukamolson [20] adds that "Survey research uses scientific sampling and questionnaire design to measure characteristics of the population with statistical precision (p4)." The questionnaire was divided into three categories such as communication, student learning, and administrative and managerial tasks. All the teachers were involved to get a larger view of the chosen question. He used a self-administered questionnaire. Sukamolson [20] asserts, "Self-administered

questionnaires can be used for pre-testing of program materials (p14).”

After the baseline data collection, intervention strategies were administered to the staff.

3.2 Data Analysis

This section presents data analysis which was collected through a questionnaire. The section attempts to answer the major research question, how can I improve my school leadership using technology? using the data collected from the participants. It is further supported by the literature.

A total of 34 teachers were surveyed. After having administered the survey questionnaire, he with the help of my Critical Friend (CF) analyzed the data. The data provided by the participants were all compiled serially to get the base of the research. His motive while analyzing the collected data had to go in line with the research

question. The data were analyzed in three categories viz communication, student learning, and administrative and managerial tasks.

3.3 Findings from the Data Collection

After having analyzed the baseline data from the participants, it revealed that there are some obstacles that he needed to improve and work on. The lack of knowledge in Information technology, communication ineffectiveness, need for ICT platforms, not making an informed decision using data, students lack ICT facilities to augment learning, school resources not digitalized, and lacks ICT inclination to the staff to ease their works and grow professionally. Technology usage to close the gaps of school administration and management was suggested.

3.4 Baseline Data

Statistical data on the survey questionnaire is presented in the form of a column graph.

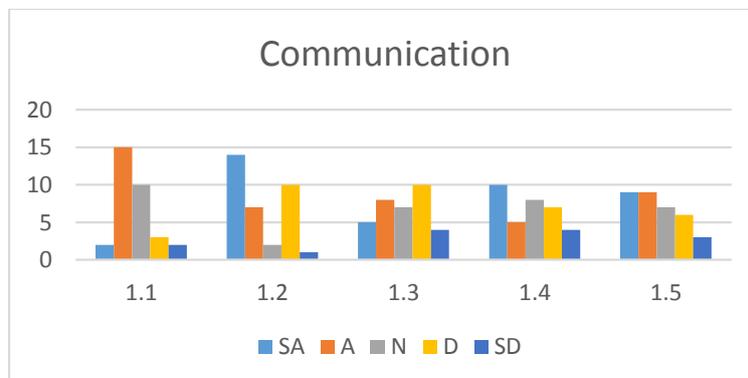


Fig. 1. Graph showing communication

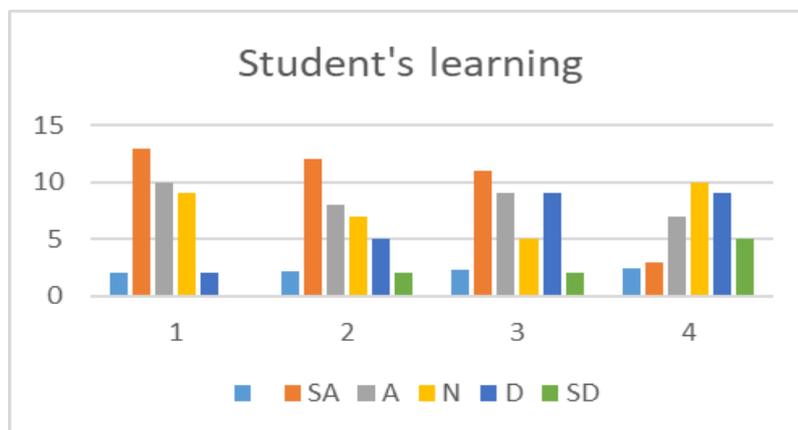


Fig. 2. Graph showing student's learning

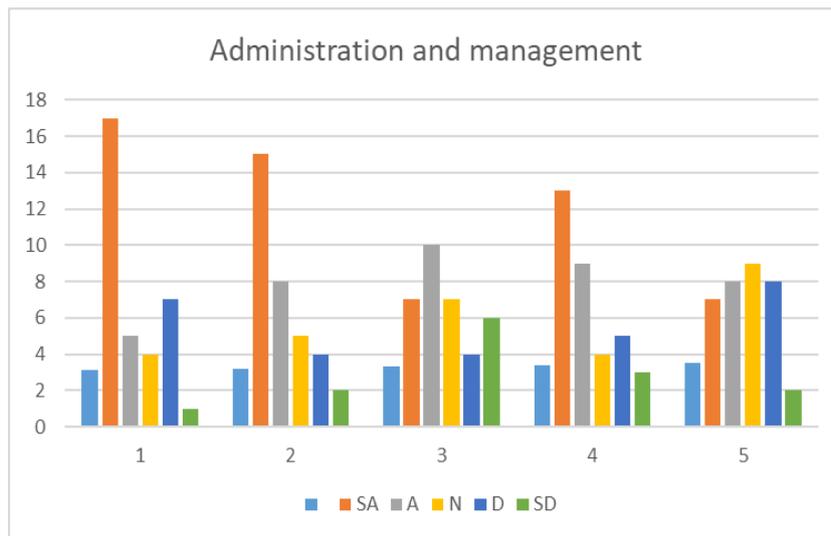


Fig. 3. Histogram of administration and management

3.5 Intervention Strategies

To overcome the above-mentioned shortfalls in the context of the impact of technology on school leadership, these three main approaches were implemented over three months.

3.6 Communication

The principal should be more aware of how they will further improve their technology leadership. For the principals to do this, there should be a stand-alone focusing technology in management and leadership. As evidenced by the baseline data, he sought assistance from IT teachers to enhance his IT skills. He designated his time for that and tried to do his tasks using technology. He updated online services and informed his colleagues of that. He took online courses to improve himself. Instead of fully relying on them, he consulted and pushed himself to move forward. Internal communications were made easier by technological advancements in schools. The type of medium used was made friendly to all the users for effective communication. However, depending on the situation, he preferred face-to-face meaningful communication for set objectives and social bonding.

While the overarching principle of communication is clear and timely and to bring about effective and meaningful communication, he formed varied WhatsApp groups such as JHSS Administrators, School Management Team (SMT), Hostels Management Team,

Professional, JHSS (Official), JHSS Desuup, and COVID Committee. They shared our good practices in the teaching-learning process in the professional group.

Sometimes, when he needed an urgent update or immediate response than usual, he sent a direct message to a particular colleague or made a call. He gave priority to communications than standard messages in some ways. Otherwise, they were treated as common and put on the normal mode.

He called teacher colleagues for midterm review plus mentorship. He shared his goals and expectations from them for the growth and the wellbeing of the school. It is all documented and kept in my office.

3.7 Student's Learning

The integral purpose of the school is to excel in student's learning. Student's learning has to shift from what to learn to how and why to learn. Technology has become inevitable in today's world and student's learning is also strongly aligned with it. According to Ratheeswari [21], in today's world, information and communication technologies (ICTs) are causing rapid changes. They have an impact on every element of life. The effects are becoming increasingly noticeable in classrooms. Society is driving schools to respond appropriately to this technological progress since ICTs give both students and teachers greater chances to customize learning and teaching to individual requirements. But he

adds that students and teachers must have sufficient access to digital technology and the internet in their classrooms, schools, and teacher education institutions to successfully harness the power of modern information and communication technologies (ICTs) to promote learning. Teachers and students need access to high-quality, relevant, and culturally sensitive digital content. However, there are challenges associated with such facilities in the school.

As such, he facilitated students with additional IT labs besides the ones provided by the government. Computers were installed and the school could get ten more laptops from donors. The school established history and maths labs to augment student's learning. These labs were in line with technology usage to soar their learning.

To ease the number of students in the lab, the labs were designated to students with proper timing. The school provided additional projectors and accessories. The school has two SMART boards to boost their learning.

Leveraging the technology's empowerment, he produced a pupil's academic report and planned accordingly. It also assisted him to set the teacher's targets and keep track of it. Data speaks a lot and it presents objectively. It clears the school's stand academically.

In addition to it, the learning progress of each student is been traced. To get a glance at the student's performance, it is coloured range-wise. (below 45% red, below in between 45 and 59% blue, in between 60 and 69% purple, and above 70% green).

3.8 Administrative and Managerial Aspect

3.8.1 Online services

During the intervention stage, online services were developed and staff oriented. They started using these online services and found them handy later. The services were disrupted by technical glitches sometimes, however, most of the time, it served its purpose. These interventions saved papers and became reliable documents. It became accessible and I could respond swiftly for better administrative and managerial improvement.

The services were students' attendance; students' conduct tracking, lesson plans, and all the plans, Online systems, results, hostel and class assessments, Professional Development records, student volunteer records, etc. All the school information and documents were uploaded to google drive and made available anytime.

3.9 Post Intervention Data Findings

Technology positions me to make informed decisions. It also enables me to communicate the pupil's performance and come up with an informed way forward to improve children's academic performance. Susmita [22] supports this when she says that the Internet is the most important facilitator of a better, quicker, and less expensive way to run the administration and managing daily operations including information processing, information transmitting, information storage, and information retrieval.

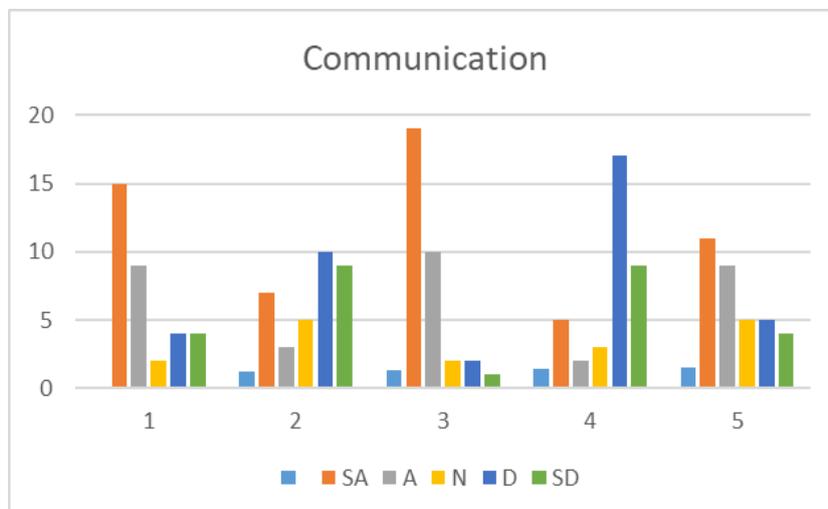


Fig. 4.

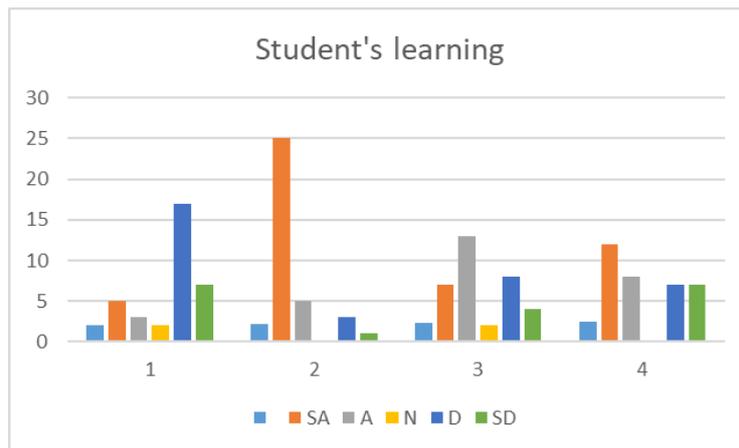


Fig. 5.

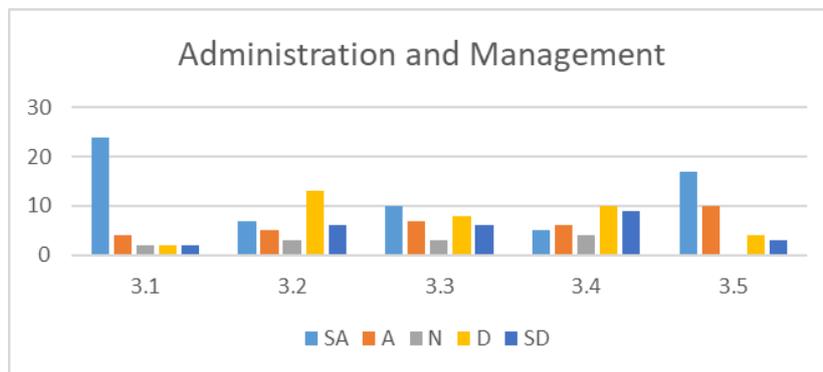


Fig. 6.

Over the years, he had been always striving to improve his administrative and managerial skills. He had been adding on his experiences to excel his tasks. Of recent, technology has advanced and equipped him to soar his administrative and managerial skills. The data confirms that technology has an impact on school leadership and approaches have been reliable and satisfactory. Statistical data on the post-intervention survey questionnaire is presented in the form of a column graph.

4. RESULTS AND DISCUSSION

Technology is indispensable in education. Unlike in the past, it has become part of education and will grow its presence in years to come. With time, the role of the school principal changes and becomes demanding. Courville (2011), "Having defined the primary role of an educational technology leader, to integrate technology into the classroom, one must examine the skills

required to be a leader in this ever-changing field (pg.4)."

Having conducted this action research on the impact of technology in school leadership, he came up with findings and categorized them into communication, student learning, and leadership and management.

4.1 Communication

Effective communication skill is the key to school leadership. Communication is of varied forms and principal has to use the best suitable ones.

Education M. o. (2021) states "Principals apply a range of formal and informal communication skills every day. Communications may be deliberately planned or ad hoc; face to face or virtual; written, video or verbal; digital or non-digital."

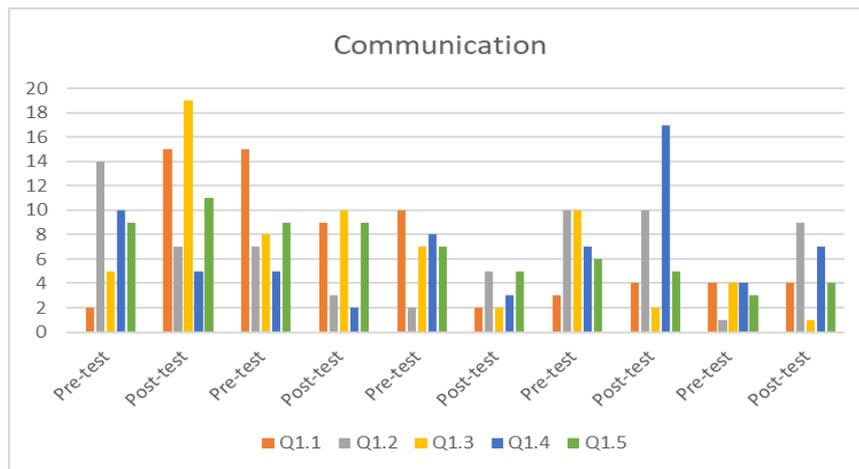


Fig. 7.

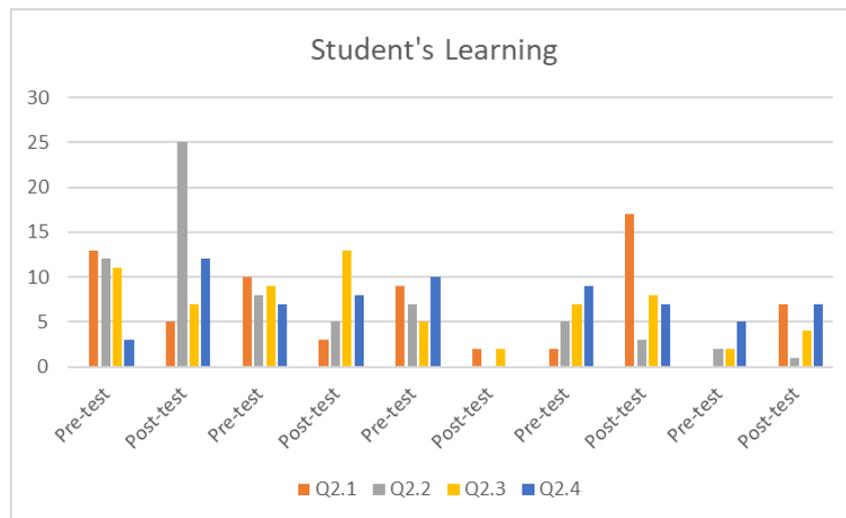


Fig. 8.

The above statistical comparative between pre-test and post-test depicts that communication impacts his leadership. The intervention strategies used have been observed effective and it has equipped him to perform better.

4.2 Student's Learning

Fig. 8 suggests that the impact of technology on school leadership correlates with student's performance. The result strongly supports when students are facilitated with technology, they achieve the best scores. The data analysis of student's achievement and pupil's reports has positioned him to plan and execute accordingly.

4.3 Administration and Management

The study reveals that technology eases administrative and managerial to a larger extend.

The findings from the comparative data of pre and post of thirty-four teachers are overwhelming. The principal's efficiency enhances while using technology. He also influences his colleagues to use so that the school practices technology-driven approaches in the teaching-learning process.

From the above results, it is clear that the present teacher's perception of technology of school leadership is not up to the mark. The baseline data on three categories namely communication, student learning, and administration and management revealed that however after intervention strategies, it improved.

The current practices of Principal on leveraging technologies in his leadership was minimal. His

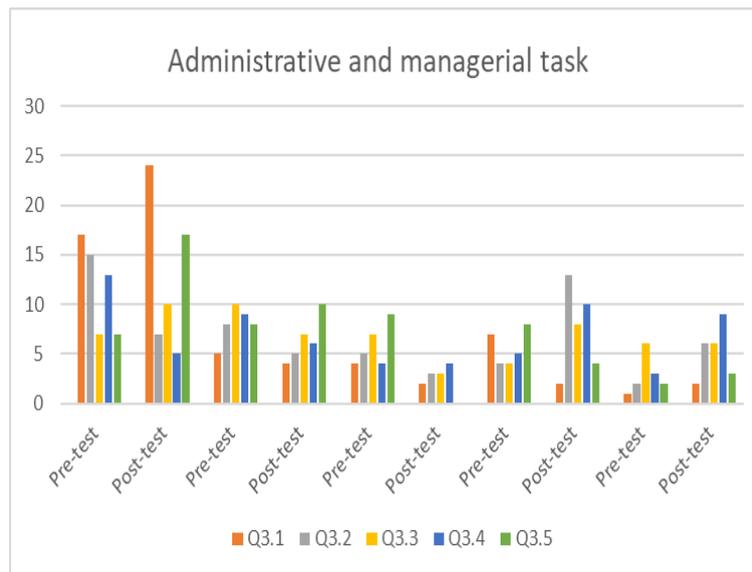


Fig. 9.

lack of knowledge of technology dragged him back. The intervention strategies have impacted the teachers and resulted in better performance as revealed in the post-test.

The findings from the research proved that technology strengthens school leadership. In all three categories namely communication, student learning and administration and management, technology has its impact on school leadership. The teachers expect the Principal to be technological friendly and student's achievements are directly proportional to it.

5. CONCLUSION

Over the past 12 years of school leadership, the rate at which technology has been emerging is so rapid. With the change in the educational landscape, school leaders have to leverage technology to personalize learning and actualize one's potentials. When the school leaders adapt to the advancement of technology, the school inclines towards professional growth and learning suit the students.

The action research was based on three aspects of school leaders namely communication, student learning, and administration and management. The impact of technology on school leadership was found very high. The technology strengthens the school leadership.

Such moves enable us to deliver timely and updated services. As the greatness of the school

depends on school leaders, it was felt occasional researches need to be carried out for professional growth and to move with time.

I strongly feel to share our work and its findings with Principals in the dzongkhag and if possible in other forums too.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX A

1. Major Functions of technology on school leadership Resources

Questionnaire

1. Communication	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
The principal shows genuine interest and concern for technology					
The principal is not sound in technology					
Principal uses technology to have effective communication in school					
The principal does not apply technological knowledge for the growth of the school					
Principal's communication is more effective through technology than in person					
2. Student's learning					
The principal does not facilitate classroom learning using technology.					
The principal uses data to analyze the student's achievement					
Principal lacks to create avenues for students to use technology to learn better					
The principal encourages students to use technology to perform better					
3. Administrative and managerial tasks					
Principal's efficiency shall enhance using technology					
The principal does not manage the school effectively using technology					
The principal is informative and resourceful on school performance using technology					
The principal does not record all the school documents in soft and online					
Principal influences his colleagues to use technology					

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