Integration of Information, Communication and Technology in Secondary Schools of Nepal: Policies and Practices

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Abstract

The article explores the policies, provisions, and practices on the integration of ICT in the education system of Nepal. It was a quantitative survey study in which the policy provisions and practices were analyzed critically and empirically. The participants were selected using purposive and convenience sampling from the targeted population. An online questionnaire with 29 items was constructed as a tool for data collection and was distributed to secondary-level teachers, who were teaching at government public schools in Nepal via emails. The data was further analyzed statistically by calculating Percentage, Average, Chi-Square test (Goodness of fit), and P-value analysis using MS Excel. A value of $p<0.05$ was considered significant. It was found that integration of ICT in education is positioned as a major concerning phenomenon in educational policies and programs conducted by the Government of Nepal. Secondary schools in Nepal are still facing numerous deficiencies and challenges, among them the scarcity of technical knowledge and competency of teachers is a major one. Based on UNESCO's four-stage continuum (emerging phase, applying phase, infusing phase, and transforming phase); public schools in Nepal are in the emerging phase as the development of ICT-related infrastructure, nevertheless, only a few numbers of schools have competent, dedicated, qualified, and trained human resources. Therefore, Governmental and non-governmental organizations and policymakers have clear action plans to build infrastructures, teacher motivation, skill, competence, and positive attitudes of teachers, parents, and students.

Keywords: *ICT integration, opportunities, challenges, teachers' opinions.*

Introduction

Background

Today's World has been significantly affected by the evolution of communication technology, computer networks, and information technologies (Kingsley & Patience). Information, communication technology (ICT) is the combination of hardware and technology used to store, manage, and analyze information (Kaware &Sain, 2015; Zakaria & Khalid, 2016). It has become an important pillar of modern life (Joshi, 2017); hence, the impact of technology can be felt in every possible way, one of which is education (Raja & Nagasubramani, 2018). While education plays an important role in transforming the entire country into a digitally empowered society, the knowledge economy and technology itself also play a significant role in educational processes and outcomes, therefore, the relationship between education and technology is bidirectional (Perzada & Sheikh, 2021). Wyuningtyas et al. (2022) mentioned ICT has a substantial impact on education, it can aid in solving educational issues, particularly in the area of administration and instruction. It serves many roles in education, such as teaching, learning, communication, professional and management (Joshi, 2016), the purpose of evaluation, and teachers' professional development (Harris et al., 2016). Likewise, several roles of ICT in education, such as Academic, Professional, Social, Cultural, and Administrative (Joshi, 2017).

Integration of ICT in Education; is defined as the effective and efficient use of ICT in all aspects of education, including curriculum, teaching and learning setting, and administrative management (Earle, 2002; Champa et al., 2019). Champa (2019) believes that the use of information and communication technology is a powerful tool, especially for change and reform in the educational system (Toni, 2013), which can be divided into three main groups: technology for pedagogical planning, tools for delivery, and technological tools for teaching- learning. In this regard, educational technologies have become the most valued component in national policies and integrated curricula in many countries in the world; from school to university level (Joshi, 2017). The government of Nepal (GoN), Ministry of Science, Technology, and Education (MoEST), has provisioned ICT in Education as a communication and teaching tool and has counted important factors regarding the use of ICT in Education: promoting pedagogical learning, building capacity of stakeholders, including teachers and incorporating the specific curriculum into the curriculum to boost up the students' skills (Curriculum Development Center, 2019; Joshi et al., 2021).

Educational Policy on ICT Education in Nepal

The government of Nepal (GoN), the Ministry of Education, has started working to integrate ICT and has issued many policies and plans. The use of information and communication technology (ICT) in education is considered one of the strategies to achieve the general education goal (Ministry of Education, 2013). In this regard, the SSRP (2009-16) recommended the implementation and expansion of ICT-enabled teaching and learning processes in all schools, the development of infrastructure, the provision of training courses for teachers, and the provision of alternative teaching methods through the use of ICT (MoE, 2009). ICT Policy (2010 & 2015) provides support and encouragement for the integration of ICT across Nepal's education system to support administrative management, teaching-learning, and research to improve the quality of education, Nationwide initiatives were formulated and launched to enhance access to ICT-based education, life-long learning, training facilities, E-Learning, E-Schooling and so on.

The ICT Master Plan (2013-17), has aimed to decrease the digital divide by improving ICT infrastructures, human resources, digital contents, and overall enrichment in education, its mission is to expand equity in education, reduce the digital divide, and improve educational services, and it plans to build ICT infrastructures including; ICT equipment, Internet connections, multimedia classrooms, virtual data centers, and shared learning resources, training programs, and the development of human resources for ICT facilitators; teachers, instructors, decorators, policymakers and administrators (MoE, 2013). Improving the digital curriculum and education system for teaching and learning, designing and supporting policies and regulations for the use of ICT in education to promise good governance, transparency, efficiency, effectiveness, and accountability in education. It enables the use of technology to manage (MoIC, 2013; MoE, 2013). SSDP (2016-23) has planned to enable the use of technology to manage educational information through IEMIS, including ICT, establish ICT learning centers, strengthen infrastructure in model schools, develop portals and websites, including e-libraries, teacher training courses, offline and online learning (focusing on English, Mathematics, and Science) using ICT, and prepare teaching and learning materials (such as Eds/DVDs, animated materials, videos, etc.) initially for Science, Mathematics, and English. (MoE, 2016). The National Curriculum Framework (NCF, 2007) for school education describes ICT as "a proven tool for Educational change" (MoE, 2007;

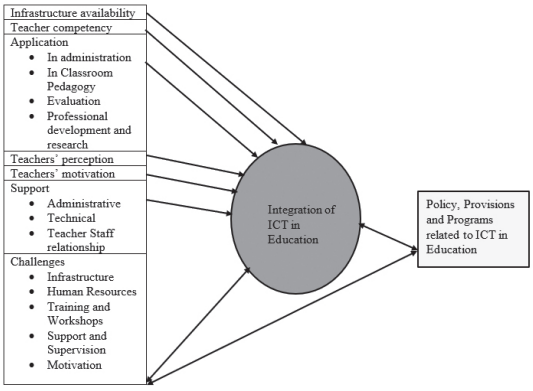
Rana et al., 2018). Similarly, NCF (2020) defines ICT as a tool for communicating and transforming information, a tool for teaching other subjects, as well as a distinct subject (MoEST, 2020).

Efforts Made to Use ICT in the Education System of Nepal

As cited by Rana et al., (2018), many researchers (Pangeni, 2016; Rennie, 2007; Shields, 2011) have reported the expansion of internet infrastructures across Nepal and argued that this will enhance learning, provide support to school teachers, and promote student leaning in rural schools by providing online access to new information. Many governmental agencies, NGOs/INGOs are planning the distribution of computers, laptops, and other equipment to teachers and students, teacher development, and teachers' professional development programs (Joshi, 2017). ICT and Computer courses have been provided in general education and technical training (MoE, 2015). For example, the National Center for Educational Development (NCED) provides training to teachers through national Radios and FM, and computer science has become an elective subject in schools (Grades 9-12); undergraduate and Postgraduate courses are offered by various universities and colleges, different institutions are conducting training programs related to ICT and Computer; and Tribhuvan University has started offering bachelor's degree in Computer Science Education (MoIC, 2017). In Nepal, different NGOs have launched projects such as Open Learning Education (OLE-Nepal), One Laptop per Child (OLPC), Wireless Network Projects (WNP), HRO Nepal, Information Technology Society of Nepal (ITSN), and more (Dhital, 2018), these projects are very important for people's needs in this technological world (Tiwari, 2021). The Government has initiated the use of ICT in Education, introducing different policies, plans, and programs. Different studies have been conducted to evaluate policies and practices regarding the integration of ICT in education. However, the effectiveness of its policies, plans, programs, and practices has not been plentifully evaluated, and differences can be seen through research (Rana et al., 2019). Therefore, a diverse exploration was identified in the Nepali context.

Conceptual Framework

The above discussion indicates that it seems that the government has prioritized the use of technology in education. The researcher has outlined this study to understand the relationship between actual application and policy provisions associated with ICT in education. The conceptual framework was as;



Research Questions

The core drive for conducting this study was to investigate the Nepali Government's policies and practices on integrating new technologies into education. This study aims to answer the following research questions;

1. What is the status of physical and human resources for the use of ICT in education?
2. How can Information and Communication technologies be used for educational transformation?
3. What are the barriers that prevent the successful integration of ICT into Education?
4. What is the status of implementation policy provisions in Public Schools in Nepal?

Methods and Materials

A quantitative survey study was conducted to investigate the integration of ICT in education. It has aimed to explore policy provisions and practices on the use of ICT in the educational system. The sample was selected from the general population of secondary-level teachers' indifferent regions of Nepal. The participants were selected using purposive and convenience sampling. The sample consisted of 150 secondary level teachers, who were teaching at government schools in Nepal in different regions. A questionnaire for teachers (QT) was developed to collect data that consists of 29 questions or items with multiple responses, that were divided into four themes, such as: status of physical and human resources (items 1-7); application of ICT in education (items 8-14); perception of teachers on using ICT in education (items 15-24); and challenges, support, and suggestions (items 25-29). After the creation and validation of the questionnaire, it was distributed to government schools' secondary teachers via different online amenities such as emails, WhatsApp, Messenger, and Viber. Those teachers who were interested in participating could reply to the responses and were reminded of the voluntary nature of their participation, as well as the confidential and anonymous nature of their information. After collecting the data, the researcher organizes it and analyzes it quantitatively using percentage, average, Chi-Square test (Goodness of fit), and P-value analysis using MS Excel. A value of $p<0.05$ was considered significant. Similarly, numerous previous research studies, policy provisions, and programs adopted by GoN were critically analyzed to triangulate the findings of this study with previous knowledge.

Results

The main aim of this study was to investigate the status of the use of ICT tools and techniques for educational transformation (in administration, communication, academic, and pedagogical process) in secondary schools of Nepal, and critical analysis of policy provisions associated with ICT integration in Education. Likewise, it is concerned with the minute analysis of existing deficiencies and challenges in the use of technology in education. The results of the research are divided into the following headings: the status of physical and human resources, the status of ICT application in education, teachers' opinions on the use of ICT in education, challenges, support, and suggestions for ICT application in education.

Status of Physical and Human Resources

Physical and human resources are prerequisites for operative adoption of Information and communication technology in education. Physical resources include internet facilities, sufficient computers, a computer laboratory, an overhead projector, and so on. Similarly, human resources encompass well-trained, qualified, and competent teacher staff for the effective use of technologies in the educational system.

Development of ICT Infrastructures

The development of adequate physical infrastructures is a fundamental and most important requirement for the effective use of technology in education. The status of physical infrastructures was analyzed with the following parameters.

Table 1: Status of ICT Physical Infrastructures

S. N	Infrastructures	Status		$\chi 2$	P-Value
		Yes	No		
1	Is there an internet Facility in your school?	140 (93.3%)	10 (6.7%)	112.66	<0.01
2	Is there a computer Lab in your School?	100 (67.7%)	50 (33.3%)	16.66	<0.01
3	Are there sufficient computers in your school?	72 (48%)	78 (52%)	0.24	0.62

4	Is there anoverhead Projector (OHP) and Interaction Board in your school?	74 (49.4%)	76 (50.6%)	0.026	0.87
5	Do all the teachers have Laptops for use in Teaching and learning?	32 (21.3%)	118 (78.7%)	49.30	<0.01
6	Are all the classrooms in your school electrified?	92 (61.3%)	58 (38.7)	7.70	<0.01

The above data indicates the status of ICT infrastructures in Government Public Schools of Nepal. It showed that 93.3% of participants responded their schools were connected to internet services, 97.7% of schools have computer laboratories, 48% have sufficient computers as the ratio of students, 49.4% of schools have access to OHP (Overhead Projector) and Interaction Board, only 21.3% school have one teacher on a laptop, and around 61.0 % Schools were fully electrified. The data above were analyzed using the chi-square test (goodness of fit) with a significance level of 0.05. Except for the adequacy and sufficiency of computers, OHP, and interactive boards in schools, the P-value of all variables is less than 0.05, indicating that the presence of ICT infrastructure in public schools in Nepal is significant.

Development of Human Resources

The development and effective use of ICT for the improvement in teaching-leaning, and educational transformation; the competent, dedicated, skillful, and well-trained human resources in necessary. In this research study, the human resources are considered as teachers in schools, who were practicing for the use of technologies in their pedagogical practices as well as schools 'administrative works.

Table 2: Status of Human Resources

Statement	Status	Respondents	χ2	P- Value
7. What percent of teacher staff of your school are capable of using ICTs in teaching, learning, and other administrative tasks?	80% Capable	36 (24%)	10.8	0.01
	60% Capable	54 (36 %)		
	40% Capable	27 (18%)		
	20 % Capable	33 (22%)		

The above data demonstrates that only 24% of schools are 80% capable (80% capable = well trained, able to use different software, construct digital materials, use ICT for administrative tasks, etc.). The chi-square value associated with the above parameters was 3.6 and $p = 0.01286 < 0.05$ implies that the competency of human resources has a significant role in the effective implementation of ICTs in academic processes (Administration, T/L activities, and other tasks).

Status of Application

The application of information and communication technology is felt in all aspects of education. It was analyzed with the subsequent parameters.

Table 3: Status of Application

S. N	Statements	Indicator	Responses	χ2	P-Value
8	Have you ever used any Software in teaching and learning and for an administrative task?	Yes	129 (86%)	77.76	<0.01
		No	21 (14%)		
9	If you have to use any software in teaching and learning, which you have to use?	Microsoft Office (MS Word, Excel Power Point, etc.)	90 (60%)	67.66	<0.01
		Dynamic Software (Geo-Gebra, Graphic Calculators, and more)	50 (30%)		
		No any	10(10%)		

10	How much time do you use this software in your teaching-learning process?	Every Day	9 (6%)	94.32	<0.01
		Most of the time	54 (36%)		
		Sometimes	78(52%)		
		Not used	9 (6%)		
11	Are you familiar with Google Classroom?	I always use it.	27(18%)	84.93	<0.01
		Sometimes, I use it.	84 (56%)		
		I have listened to it, but not used it yet	31 (20.4%)		
		I have no idea about it.	8 (5.6%)		
12	Which of the following tools is most commonly used for formative evaluation?	Home Work	48 (32%)	96.52	<0.01
		Unit Test/ Class Test/ Monthly Test	63 (42%)		
		Terminal Examination	9 (6%)		
		Google MCQ Test	8 (5.6 %)		
		Project Works	15 (10%)		
		Others (Monthly Test, Class Test, etc.)	7 (4.4%)		
13	Which of the following tools is used to organize and publication of results?	Excel	63 (42%)	82.86	<0.01
		Word	18 (12%)		
		Google Sheets	12 (8%)		
		Hard Copy Records	50 (33.3%)		
		Other Software's	7 (4.7%)		
14	Which of the following tools is more applicable for administrative tasks in school?	Emails	33 (22%)	38.21	<0.01
		Microsoft Office (MS Word, Excel, etc.)	40 (26.7%)		
		IEMIS	65 (43.3%)		
		Other	12 (8%)		

The above data showed that knowingly/ unknowingly, more than 80% of teachers were using technologies in their academic practices (i.e., Administration, T/T, Assessment, etc.). Massive numbers of them were familiar with the use of Microsoft Office Software packages (MSWord, Excel, PowerPoint, etc.), in their educational works, and some of them know dynamic software (for example: Geo-Gebra for mathematics) for their pedagogical and administrative management. Nevertheless, a low number of teachers only (6%) were using it regularly. The fact that the P-value is less than 0.05 ($p<0.05$) in each statement shows that the use of technology in education is significant.

Teachers' Opinions

Table 4: Teachers' Opinions

S. N	Statements	Indicators	Responses	$\chi 2$	P-Value
15	What do you think about the use of ICT in education?	The use of ICT is essential.	50 (33.3%)	119.04	<0.01
		It makes learning more interesting.	62 (41.3%)		
		It helps students more active and motivated.	13 (8.7%)		
		It takes a long time to use.	10 (6.7%)		
		It makes students feel bored.	7 (4.6%)		
		Others	8 (5.4%)		
16	Do you agree with the statement, Use of ICT is indispensable for Teaching and Learning?	Strongly Agree	89 (59.3%)	262.56	<0.01
		Agree	48 (32%)		
		Partially Agree	8 (5.4%)		
		Partially Disagree	5 (3.2%)		
		Disagree	0 (0%)		
		Strongly Disagree	0 (0%)		
17	What are the areas of use of Information and Communication Technologies in Classroom teaching and learning?	As an innovative tool for learning.	45 (30%)	57.68	<0.01
		For the concrete representation of abstract concepts and deep learning.	40 (26.7%)		
		For students' motivation and concentration	35 (23.3%)		
		It makes learning more difficult	9 (6%)		
		Tough to use and prepare content and more time-consuming.	15 (10%)		
		Others	6 (4%)		

18	As per your use, which of the following is more applicable for teaching and learning?	Microsoft Office (MS Word, Excel, PowerPoint, etc.)	48 (32%)	62.56	<0.01
		Dynamic Tools (Geo-Gebra, Graphic Calculators, etc.)	36 (24%)		
		Google	37 (24.6%)		
		YouTube	16 (10.6%)		
		All the above	5 (3.2%)		
		None of above	8 (5.6%)		
19	What is the reaction of your students while using ICT in your classroom activities?	They enjoy their class	39 (26%)	76.88	<0.01
		They participate actively in classroom activities	44 (29.3%)		
		They are more motivated to learn	45 (30%)		
		They tend to get distracted	9 (6%)		
		They feel bored in their classroom	10 (6.7%)		
		Others	3 (2%)		
20	What difference do you have to feelbetween using and not using ICTs in your classroom activities?	Easy to present content	42 (28%)	22.64	<0.01
		Students enjoy their class	28 (18.7%)		
		Enhance sustainable learning	18 (12%)		
		Innovative teaching and learning process	30 (20%)		
		Tough to finish the course on time	20 (13.3%)		
		Tough to manage time and content preparation	12 (8%)		
21	How many experiences have you had using ICTs in your classroom to assess student's performance?	Applicable to access students' learning via innovative tools rather than paper-penciltests.	42 (28%)	23.76	<0.01
		Students' judgment without physical attendance	33 (22%)		
		Easy to construct and analysis result	21 (14%)		
		Applicable to save the records	25 (16.7%)		
		Demand for more expertise in constructing items and	16 (10.6%)		
		Students can lose their creativity	13 (8.7%)		
22	Which of the following skills is necessary to integrate ICT in objectives, contents, T/L activities, and assessment?	Effective time management skill	15 (10%)	122.72	<0.01
		Content Knowledge	12 (8%)		
		Technological Knowledge	18 (12%)		
		Pedagogical Knowledge	20 (13.3%)		
		Continuous learning and investigation	10 (6.7%)		
		All the above	75 (50%)		
23	In your opinion, which aspect of the educational system is the use of ICT more applicable?	Administration (Admission, Attendance, Result Publications, etc.)	20 (13.3%)	122.96	<0.01
		For innovative Pedagogical Practices	15 (10%)		
		Students' records (IEMIS)	18 (12%)		
		For Student assessment	13 (8.7%)		
		Knowledge creation and sharing	9 (6%)		
		All the above	75 (50%)		
24	The use of ICT can help to overcome the apathy of the educational system.	Strongly Agree	64 (42.7%)	168	<0.01
		Agree	60 (40%)		
		Partially Agree	12 (8%)		
		Partially Disagree	10 6.7%)		
		Disagree	3 (2%)		
		Strongly Disagree	1 (0.6%)		

Numerous factors play a role in the efficient use of technologies in educational practices, among them teacher's perception is one. The majority of teachers (59.3%) strongly agreed with the statement "application of technologies in education is essential", indicating that they have a positive attitude towards it. Also, they believe that the effectual use of technology can help to overcome problems, and challenges in the education system. $P<0.05$, for all indicators shows that the perception of the teacher plays a significant role in integrating learning through ICT.

Challenges, Support, and Suggestions

Table 5: Challenges, Support, and Suggestions

S. N.	Statement	Variables	Respondents	$\chi 2$	P-Value
25	Is there a culture in your school about sharing Innovative learning Ideas and the use of ICTs in teaching-learning with staff to staff?	Always	45 (30%)	32.88	<0.01
		Most of the Times	33 (22%)		
		Sometimes	60 (40%)		
		If necessary or, never	12 (8%)		
26	What challenges you have felt while using ICTs in your School?	Insufficiency of infrastructure	36 (24%)	19.92	<0.01
		Fewer opportunities for Training and Workshops	60 (40%)		
		Having less technical skills and Competence	24 (16%)		
		Less Administrative Support and Supervision	30 (20%)		
27	What about the support from different agencies for the use of ICT in your school?	Supported by Head Teacher and School Administration	58 (38.7%)	39.33	<0.01
		Supported by SMC	17 (11.3%)		
		Self-Motivation	35 (23.3%)		
		Less Support from Head Teacher and School Administration	21 (14%)		
		Less Support from Parents and SMC	19 (12.7%)		
28	What are the main concerns of school administration, management, and stakeholders regarding the use of ICT integration into educational practices?	Development of infrastructures	75 (50%)	66.05	<0.01
		Teacher training and workshops	45 (30%)		
		Making Accessible to Students	16 (10.6%)		
		Applying academic improvement	14 (9.3%)		
29	What efforts should be necessary from stakeholders for the effective application of ICT integration in Education?	Focus on ICT infrastructure development	44 (29.4%)	8.4	0.03
		Motivate all teachers and staffto use it.	32 (21.3%)		
		Create opportunities for training and workshops	48 (32%)		
		Applying the knowledge acquired from teachers' training in a real classroom.	26 (17.3%)		

Teacher-staff cooperation and collaboration are essential for cogent integration of ICT in Education 30% responded that there is a culture of knowledge and idea sharing. While integrating innovative technological tools and techniques in educational processes, they faced several challenges and problems as 24% faced problem-related insufficiency of infrastructures, 40% lacked teacher training and workshops, 16% lack of technical knowledge, skills, and competency, and 20% lack of administrative support and supervision. Also, they felt that support from different agencies (Local government, District Education Office, Department of Education, Ministry, etc) is necessary for infrastructure development, training programs, administrative support, and motivation.

Discussion

Appropriate use of ICT can help expand learning opportunities by sharing knowledge faster, anytime, anywhere (Aktaruzzaman et., 2011; Luhmya, 2017). Raja & Nagasubramani (2018), found "ICT has four-fold roles in education: as part of curriculum, as instructional delivery, as tools for aiding instruction, and the entire educational process". In particular, it has a new learning nation, that is: cooperative, interactive, flexible, convenient, and multi-dimensional by changing the nature and learning environment (Kingsley and Patience, 2019). They also added that various factors, such as aims and objectives of teaching-learning, leadership, continuous support, opportunities for professional progress, investigation, time and reflection, sufficiency of infrastructures, financial

ensure and sustainability, and perception of stakeholders have the significant use of ICT in educational enhancement (Kingsley & Patience, 2019).

Public schools in Nepal are making efforts to implement ICT integration in Education as a priority by Government policies and provisions. The above result showed that 93.3% of schools have connected with internet services, 67.7% have a computer lab, 48% have a sufficient computer by the comparison of the ratio of student numbers, only 21.3% have personal laptops, and 61.3% of classrooms are electrified, however, there is lack competent, dedicated and trained human resources (only 24% of teacher staffs can use ICTs in administrative, instructional and other tasks in school). The application of ICT has a great role in the improvement of the educational system. Knowingly-Unknowingly more than 80% of teachers were using technology tools in their educational practices (Administrative, Instructional, Professional, Evaluation, etc.). Among them, massive numbers of teachers were using the Microsoft Office package (MS Word, Excel, PowerPoint, etc.) for innovative pedagogical practices, student assessment, administrative tasks, etc and some of the teachers were using interactive technological tools (i.e., Geo-Gebra for mathematics, etc). However, only 6% of teachers were using it regularly and Joshi (2016) conducted a similar study and they believe that technology can play several roles in education, such as pedagogical, occupational, organizational, managerial, and communicational. Therefore, the inclusion of modern technologies in education is an important aspect of current educational improvement and enhancement.

Teachers' self-motivation and perceptions are important factors in the success of ICT integration in education (Raja & Nagasubramani, 2018). It was found that teachers have a positive perception towards the use of information and communication technologies in education, 59.3% of teachers strongly agree with the statement 'applying ICT integration in education is indispensable'. Most of them found that their students enjoy their class, motivated to learn actively, interestingly, and interactively, and it helps teachers to present content interactively, and interestingly in an easy way. Also, it helps to learn in multiple ways. A related study by Kingsley & Patience (2019) identified that the use of ICT in T/L activities facilitates spreading the of learning opportunities and resources, as well as enhances critical, creative, and problem-solving behavior in students. Besides, having less technological knowledge some teachers maintained that the use of technologies in their educational process is more time-consuming, tough to develop digital content, students can lose their creativity and feel bored in the classroom, and could be distracted from classroom activities.

Technology integration can enable collaboration and communication between teachers and staff inside and outside the classroom. Such interaction between teachers 'staff, and learners can foster opportunities for knowledge creation, exchange, and sharing. However, employing technology as a learning tool can present numerous deficiencies in an underdeveloped country like Nepal. A study by Seifu (2020), at Aksum University, Ethiopia, found that low teacher motivation, unfavorable classroom conditions, less support from school administration, lack of electricity, and absence of technical support and expertise all made it difficult to successfully usage of up-to-date technological innovation in education. Similarly, reliable internet, electrical services, and auxiliary infrastructure (Thapa & Saebo, 2011; Rana et al., 2019); lack of skillful manpower, an expensive untrustworthy internet connection, lack of hydropower, geographical elevations, and security issues are major challenges for the ICT integration in public schools of Nepal (Dawadi & Shakya, 2016). Correspondingly, Champa et al., (2019) identified four primary obstacles, such as inadequate training, insufficient software, insufficient competency, and insufficient resources, and time. In this regard, this particular study found similar deficiencies, such as; lack of infrastructure, insufficiency of training- workshops, scarcity of technical skills, and competence, less

teacher motivation, administrative support and supervision, and effective model. For the meaningful overcoming of such deficiencies, the interaction, collaboration, and cooperation between different government and non-governmental organizations is essential.

ICT Master Plan (2013-17), has focused on the improvement in physical structures, development of personnel, development of digital content, and enrichment in practices to reduce the digital gap (MoE, 2013). Dijk (2020), the digital gap was measured in three levels, such as: first level (disparity in access); second level (disparity in enthusiasm and competence), and third level (disparity in opportunities and prospects of use). Government public schools have an insufficiency of physical and well-trained, dedicated, self-motivated human resources so it is still threatening to minimize the digital divide in innovative educational practices. As cited by Majumdar, 2009; UNESCO four sage continuum for the adaptation of ICT in education as the Emerging Phase, Applying Phase, Infusing Phase, and Transforming Phase. Government policies, and provisions focus on four major pillars: infrastructures, connectivity, T/L materials, and human resource development (MoEST, 2022), The public schools are in the phase of infrastructure and human resource development implies that we are at the phase of emerging and somehow at applying phase.

Conclusion

Technology integration in the education system aids in bringing innovation in curriculum, administration, instructional pedagogy, and evaluation processes. Particularly, it helps to make teaching more interesting, meaningful, attractive, and creative as well as inspires students for self-creative learning, and problem-solving skills, and opens the doors for multiple opportunities in the global village. So, the conversion of our educational practice is obvious. Government policies and programs have taken some initiatives to adapt emerging innovative technologies in the education system. It should be taken as a positive effort; however, government schools in Nepal are found to be paying more attention to building physical infrastructures rather than transforming educational practices. The development of ICT-related infrastructures is gradually progressing; the majority of schools have internet facilities, computer labs, and other technological tools and devices; nevertheless, only a few schools have competent, enthusiastic, well-trained, and qualified human resources. In this regard, the school administration, SMC, Local government, and other concerned governmental and non-governmental organizations have a persuasive plan along with the construction of physical infrastructures, teacher professional programs (i. e training, seminars, and workshops), and knowledge sharing interaction programs.

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