Spandan Peer-Reviewed Journal Year: 13 Vol.13 Issue: 1 June 2023

DOI: https://doi.org/10.3126/spandan.v13i1.76031

Use of Web 2.0 Tools and Technology in Secondary Level School: Situation and Challenges

Suresh Bahadur Diyal
suresh.diyal@sac.tu.edu.np
Sanothimi Campus, Bhaktapur, TU

Romkant Pandey
romkant.pandey@cded.tu.edu.np
Central Department of Education, TU

Abstract

This study investigates the integration of Information and Communication Tools and Technology (ICT) in secondary government schools within the Bhaktapur district, highlighting both usage and challenges. A quantitative research design surveyed 462 ICT teachers and students across 22 schools. The findings show that teachers and students effectively use a variety of ICT tools to enhance teaching and learning. These include hardware and software tools, communication and collaboration platforms, and E-learning systems. Despite these advancements, challenges such as slow internet bandwidth, insufficient hardware, lack of trained personnel, and poor school management hinder the optimal use of ICT tools. 70 percent of teachers update their ICT skills independently, with minimal governmental training support. The School Sector Development Plan has significantly contributed to developing ICT infrastructure in 39 percent of schools, but issues like inadequate Wi-Fi signals, insufficient practical classes, and large student numbers persist. Moreover, 65 percent of teachers rely on school administration to resolve ICT-related issues, and 95 percent of students have access to ICT tools, though usage is sometimes disrupted by power outages and internet issues. The study underscores the necessity for continuous improvement in internet connectivity, regular teacher training, and better management of ICT resources. The Government of Nepal's efforts through the School Sector Development Plan are promising, but sustained efforts are needed to overcome the existing barriers. By addressing these challenges, schools can fully harness the potential of ICT tools to create a more engaging and effective educational environment.

Keywords: *ICT, Web 2.0, Integration of ICT, Situation and Challenges.*

Introduction

Information and communication technology (ICT) can enhance and support learning. Computers and internet access allow students to search for information and gain knowledge beyond what teachers and textbooks provide. ICT also gives students new opportunities to practice skills such as maintaining personal websites and online publications, programming,

speaking and listening to native speakers for language learning, and creating multimedia presentations, either individually or as part of a remotely connected team. ICT devices combine traditionally separate educational media, including books, writings, recordings, videos, databases, and games, extending and integrating the times and places where learning can occur. Integrating ICT in the classroom suggests that teachers and students may need to adapt their approaches to teaching and learning specific subjects (Diyal & Pandey, 2022).

Information and Communication Technology (ICT), encompasses communication technologies such as the internet, wireless networks, cell phones, and other mediums that enable access to information. It presents immense opportunities for integrating into teacher training programs, enhancing teaching quality and effectiveness. Skilled teachers play a crucial role in shaping our society, nurturing students' creativity, and preparing them for various roles like social workers, politicians, poets, and philosophers. By fostering a friendly rapport with students, teachers create a conducive learning environment. With technology advancements influencing our lives, educational institutions are adapting by restructuring teacher education programs and classrooms to bridge the gap between current and future teaching methods and meet the evolving needs of society (Ratheeswari, K. 2018).

The evolution of the World Wide Web (WWW) is categorized into three major phases: Web 1.0, Web 2.0, and Web 3.0. Web 1.0, emerging in the late 1980s, was primarily a read-only platform, where a limited number of content creators provided static information for a vast audience. Websites were simple, offering basic contact details and brochures, similar to print advertisements, and interaction was minimal, confined to email, forums, and chat (Singh & Gulati, 2011). Its main goal was to establish an online presence and make information accessible anytime, without user participation or feedback (Patel, 2013). Web 1.0 functioned through protocols like HTTP and HTML, enabling hypertext documents accessible via the Internet (Solanki, 2016).

ICT has greatly benefited the teaching-learning process, enabling students to access required information and providing abundant knowledge on various topics of interest. However, schools face significant challenges in integrating Information Communication Technology tools. These challenges include inadequate infrastructure and resources, such as low bandwidth internet access and insufficient connectivity in computer labs. Many teachers and staff lack technological literacy, highlighting the need for training and professional development programs to equip educators with the necessary skills and confidence to effectively use ICT tools in their teaching practices.

challenges include the costs of purchasing and maintaining necessary hardware and software, as well as providing training for teachers and students. Schools may also struggle with funding and budget constraints, limiting their ability to invest in the required resources. These obstacles hinder the effective integration of Web 2.0 technologies in secondary schools. Overcoming these challenges will require a concerted effort from educators, administrators, policymakers, and technology providers.

Objectives of the Study

To explore the implementation situation of Information Communication tools and Technology in secondary-level schools and to find out the challenges of using Information Communication Technology tools in secondary schools in of Bhaktapur District are the main objectives of this study.

Review of related literature

With the growing integration of ICT, the landscape of teaching and learning is undergoing a fundamental shift. Traditional educational practices are no longer sufficient, necessitating the utilization of the abundant and captivating opportunities provided by new technologies to accomplish our training objectives and mission. In order to achieve this, teacher professional development regarding the use of interactive technology should embody and exemplify the pedagogical approaches that teachers can subsequently implement within their own classrooms (Majumdar, S. 2015). The integration of ICT into teaching-learning practices is becoming more and more important and this importance will continue to grow and develop in the 21st century (Alemu, 2015). The integration of ICT faces numerous challenges, including limited access to ICT hardware and software, inadequate government policies, ICT infrastructure, a shortage of competent ICT staff, poor coordination among institutions, curriculum disparities, high costs associated with ICT tools, insufficient government funding, reluctance to embrace ICT in teaching and learning, inadequate practical training, and limited capacity of ICT hardware and software (Rumanyika, & Galan, 2015).

According to Amuko, Miheso, & Ndeuthi (2015) in their journal entitled with "Opportunities and Challenges: Integration of ICT in Teaching and Learning Mathematics in Secondary Schools, Nairobi, Kenya" There is an insufficient level of training among secondary school teachers when it comes to effectively integrating ICT into their teaching and learning practices. Regular training on effectively utilizing ICT infrastructure is a mandatory requirement for teachers. Training sessions should be conducted at zonal levels, preferably every six months. The government should provide schools with ICT infrastructure to enable teachers to seamlessly integrate ICT into their teaching and learning practices.

According to Naresh & Reddy (2015) in their journal entitled " Challenges and opportunity of E-learning in developed and developing countries-a review" they find out, challenges to integrating Web 2.0 technologies are lack of financial support, government policies, lack of electricity and lack of other technology related skills. Developing countries have more challenges than developed countries due to lack of infrastructure. lack of awareness and systematic approaches towards technology, lack of technical support and administration support toward the implementation and attitude towards technology. It also faces challenges like lack of support from the government on the financial front, lack of efficiency and qualified trainer to teach the e-learning technology. The challenges also the poor availability of software and hardware that supports the e-learning environment and the quality or standard of education. There is lack of change and awareness even offer introduction of ICT in the education system in teaching and learning approaches.

According to the journal entitled "Readiness and Challenges of Using Information and Communications Technology (ICT) in Higher Education of Bangladesh", they find out that, educational institutions faced different types of problems like lack of infrastructural development, lack of training for teachers and teaching staffs, lack of teacher's skill, some of the educational institutions did not have internet access, is the main challenges of integrating ICT in education for teaching learning activities (Hossain et al., 2016).

Methodology

This study employed a quantitative research design with a descriptive approach. The sample population comprised 462 respondents, including 22 ICT teachers and 440 students from grades 9 to 12 across 22 government secondary schools in Bhaktapur district. The schools and

respondents were selected using purposive sampling, where specific individuals and sites were intentionally chosen to understand the central phenomenon. Data collection involved both primary and secondary sources. Primary data were gathered through structured questionnaires, while secondary data were obtained from newspapers, recorded videos and audio, articles, theses, and documentaries.

Data analysis and interpretation

Analysis of the data and interpretation of the result

Use of the internet in the school for teaching and learning

The status of the internet used by the student and teacher is shown below in the figure:

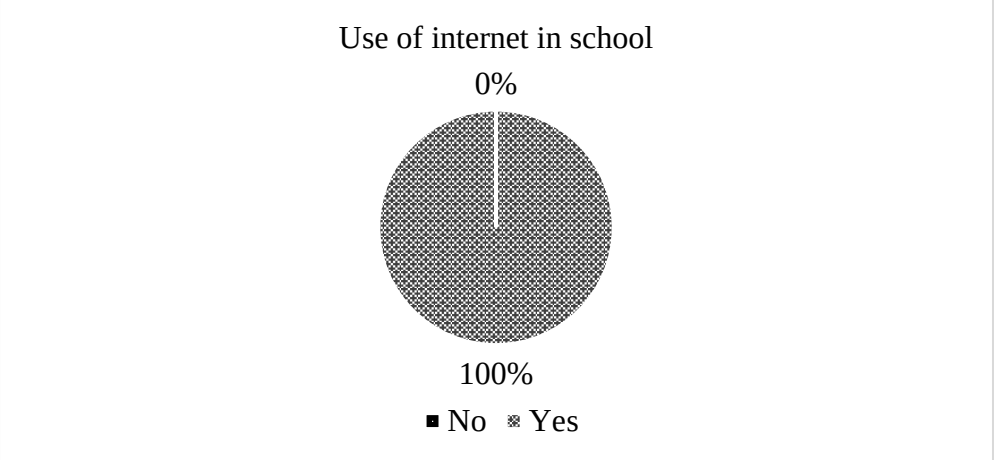

Figure*: Internet access for teaching-learning activities*

In the above figure 1, it is clearly shown that there was 100 Percent of schools have internet connectivity.

The majority number of Schools use the internet because The Nepal Telecommunication Authority (NTA) give the authority to service provider TechMandu Networks Pvt. Ltd. to expand the broadband internet in Bhaktapur District for public schools (News, 2019). Therefore, teachers and students can get internet access for the teaching and learning process in the School.

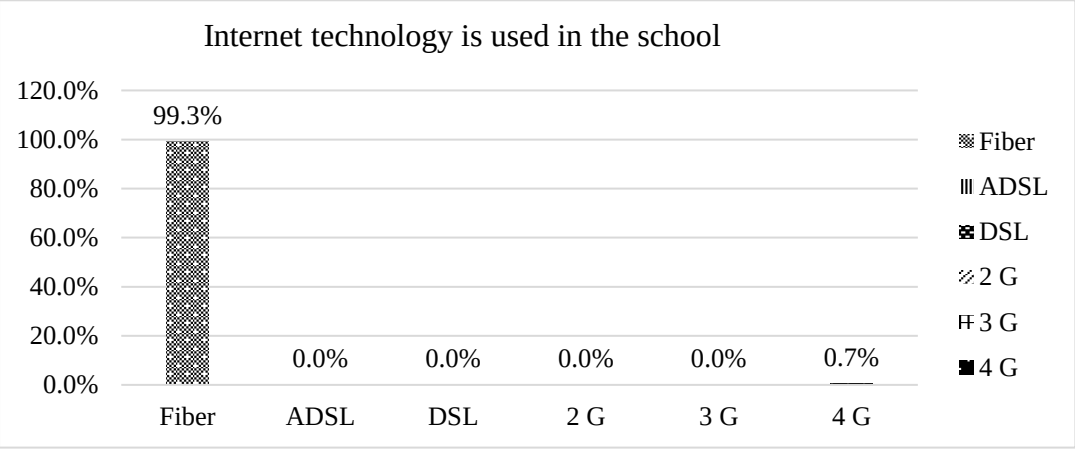

Figure 1: *Internet technology is used in the school*

The above figure clearly shows that 99.3 percent of schools used Fiber internet technology. and 0.7 Percent of schools use 4G (Generation) internet technology. Schools do not use ADSL, DSL, 2G and 3G.

Most respondents used the new technology, Fiber optics because NTA Provides Broadband Fiber optics internet facilities in the school.

Number of working computers in schools.

The status of the computers in school is shown below in the figure:

Table: *Number of working computers in school*

Number of schools	Number of working computers in school
6	40
3	35
2	34
2	22
2	39
2	43
2	45
1	15
1	52
1	25

In the above table, clearly shows that in 6 schools 40 computers are working. In 3 schools 35 computers are working. In 2 schools 22 computers are working. Similarly, in 2 schools 34, in 2 schools 39, in 2 schools 43 and 2 schools 45 computers are working. In 1 school 15 computers are working. Similarly, in 1 school 25 and 1 school 52 computers working.

According to the respondents, the number of functioning computers in schools is inadequate, especially given the large student population. Although the Rastrapati Shaikshik Sudhar Karyakaram provided a budget of Rs. 6,50,000 for purchasing ICT hardware such as desktop PCs, laptops, tablets, and mobile devices, this funding is insufficient. Additionally, many computers remain unrepaired due to a shortage of qualified technicians.

Hardware ICT tools used in school for teaching and learning activities.

The status of using hardware ICT tools by the teachers and students is shown below in the chart:

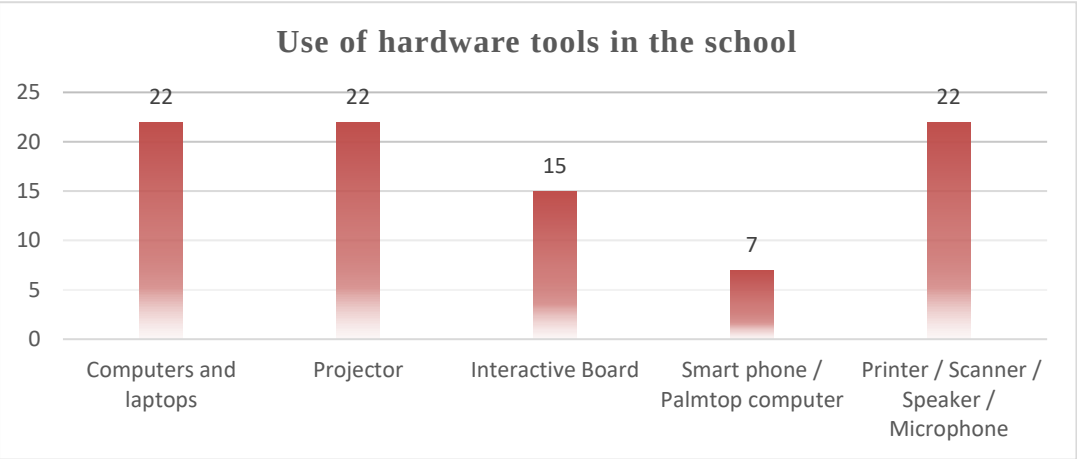

Figure: *Use of hardware tools in schools*

Above figure illustrates that all 22 schools surveyed use computers, laptops, projectors, printers, scanners, speakers, and microphones for teaching and learning activities. However, only 15 schools have interactive boards, with seven schools using smartphones or palmtop computers. According to respondents, teachers primarily use smartphones and palmtop computers. While most schools effectively utilize projectors, computers, laptops, and other ICT devices, some face challenges due to inadequate management. The Rastrapati Shaikshik Sudhar Karyakaram allocated a budget of Rs. 6,50,000 for purchasing ICT hardware, including desktop PCs, laptops, tablets, and mobile devices (MoE, 2022). Despite this support, effective use of ICT remains inconsistent across schools.

Use of Software tools in school for teaching and learning activities.

The status of the use of software ICT tools by the teachers and students are shown below in the table.

Table: *Use of Software tools used in school*

Software tools used in school	Number of Schools	Percentage %
Zoom	22	100 %
Google meet	5	17 %
IEMIS	22	100 %
Gmail	22	100 %
Yahoo	2	9 %
Any Desk	15	68 %
MS Office package	22	100 %
YouTube	16	72 %
Operating System	22	100 %
Browser	22	100 %

Table 2 shows that 100% of schools use essential software tools such as Zoom, Gmail, IEMIS, the MS Office package, operating systems, and web browsers. Additionally, 72% of schools utilize YouTube for teaching and learning activities, while 68% use Any Desk for remote desktop support. Only 9% of schools use Yahoo Mail for file transfers. According to respondents, these tools are integral to daily teaching and learning. IEMIS is particularly valuable for collecting and tracking educational data to support effective implementation (MoE, 2022). Gmail is widely used for exchanging educational materials such as project work and assignments, though some respondents also use Yahoo Mail. Word processors are essential for document creation, while Windows operating systems ensure smooth computer operation. Zoom is frequently used for online collaboration, making virtual interactions more effective. Any Desk provides remote technical support, and MS Word and PowerPoint are commonly employed to enhance teaching and learning through presentations and document preparation.

Have you got problems accessing web 2.0 in school during the period of learning?

The status of problems accessing web 2.0 tools is shown below in the table:

Table: *Status of accessing web 2.0 in school*

Status of accessing web 2.0 in school	Number of students	Percentage %
Insufficient internet bandwidth or speed	108	33%
Do not have enough ICT devices in school	173	53%
Teachers do not guide properly	39	12 %
Any others	6	2 %

In the above table, that indicates that 53% of students lack sufficient ICT devices in their schools during learning sessions. Additionally, 33% face issues with inadequate or slow internet bandwidth, and 12% report insufficient guidance from teachers during teaching and learning activities. Meanwhile, 2% of students experience other issues. The shortage of ICT devices, such as projectors, computers, and interactive boards, is attributed to the large student population, making access difficult. The limited internet bandwidth further hinders effective learning. As a result, teachers struggle to provide adequate support. To address these challenges, schools are implementing structured routines to ensure teachers can guide students more effectively despite the resource constraints.4.1.6 Are teachers use web 2.0 technology in the classroom for teaching learning activities?

Web 2.0 technology

The below figure shows the status of teachers who use web 2.0 technology in the classroom for teaching and learning activities:

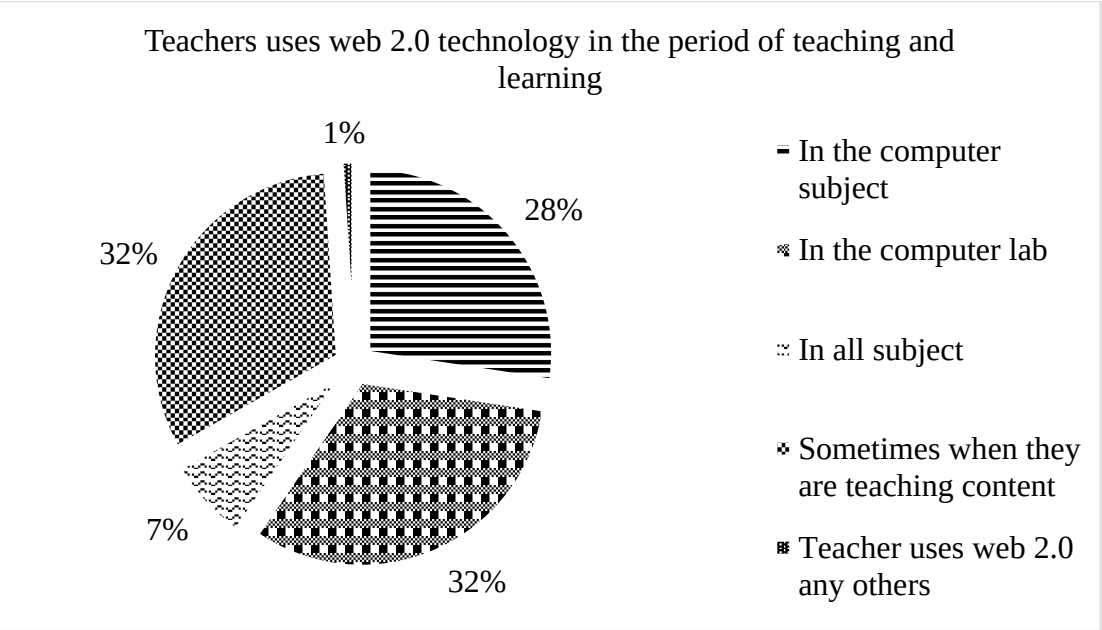

Figure: *Uses of web 2.0 technology in the period of teaching and learning*

In the above, The Figure shows that 32% of teachers use Web 2.0 tools in computer labs, and another 32% use them occasionally while teaching various content. Additionally, 28% use Web 2.0 tools specifically for computer subjects, 7% incorporate them across all subjects, and 1% use them in other subjects. The data indicates that most teachers utilize Web 2.0 technology primarily in computer labs and while teaching specific content in classrooms. Web 2.0 is also occasionally applied in subjects like Math, Social Studies, English, and

Nepali. Teachers incorporate these tools daily to enhance the effectiveness of teaching and learning by fostering interactive and engaging classroom environments.

Students ask for support during the period of learning activities.

The below table shows the status of students whom to ask for support during the period of learning activities:

Table: ***Student asks for support***

To whom do you ask for support handle security issues?	Number of students	Percentage (%)
Ask for support from the computer teacher	156	28 %
Ask for support from different subject teachers	254	46 %
Solve problem myself	67	12 %
Ask for support friends	74	14 %

According to the above table, the table shows that 46 Percent of students ask for support from the different subject teachers. Similarly, 28 Percent of students ask for support from computer teachers. Similarly, 14 Percent of students ask for support from friends. And 12 Percent of respondents solve the problem themselves.

The majority of students ask to support from different subject teachers when they have got a problem during the period of learning. According to the student if they have got any problem with using technology they ask frequently to their teachers.

Web 2.0 Tools used by Teacher

The below figure shows the status of teachers who uses web 2.0 E-learning system tools:

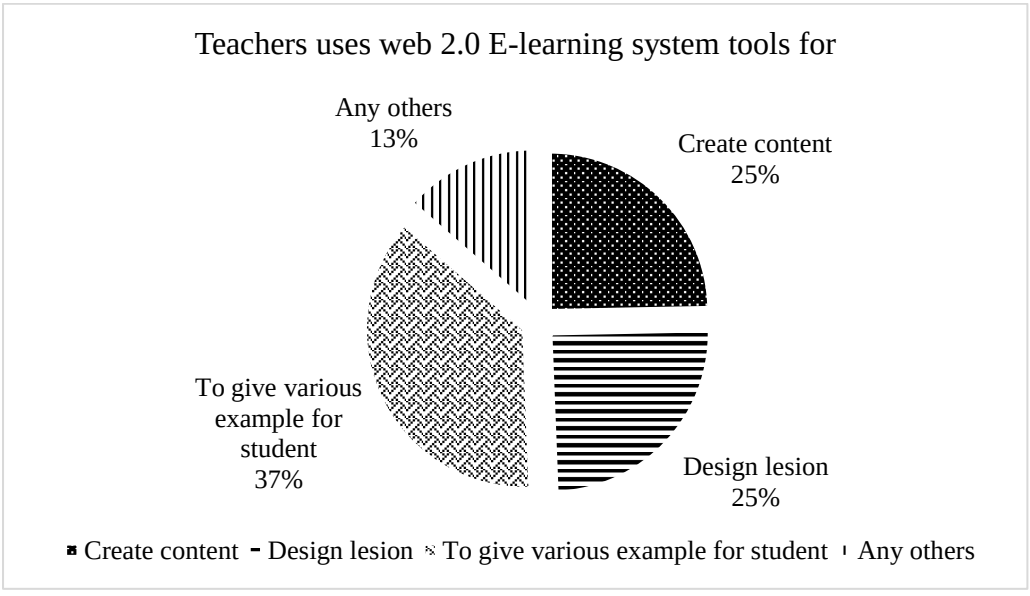

Figure: *Use of Web 2.0 E-learning system*

Above figure reveals that 37% of teachers use Web 2.0 e-learning tools to provide students with various examples, 25% use them to create content, and another 25% for lesson design. Meanwhile, 13% use these tools for other purposes. The majority of teachers leverage Web 2.0 tools to illustrate lesson topics through relevant websites, enhancing students' understanding with real-world examples. Additionally, teachers use these tools to design lessons and develop content. Occasionally, Web 2.0 tools are employed for tasks such as creating daily lesson plans, researching topic-specific innovations, and demonstrating practical technology applications in everyday life.

Condition of Computer Lab in schools

The below figure shows the condition of computer labs in schools.

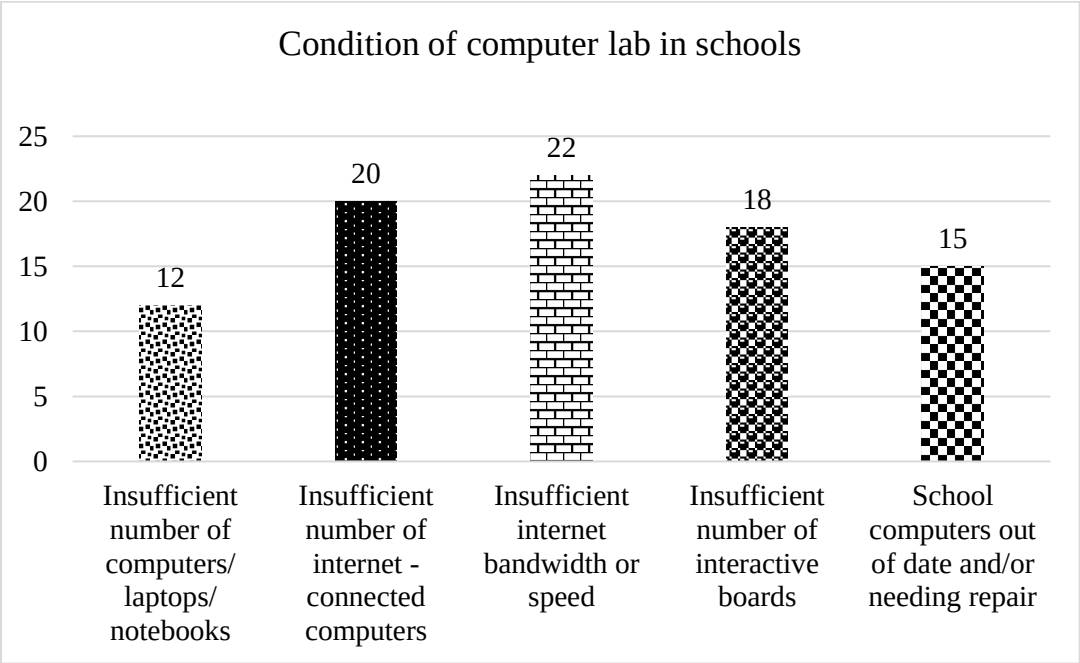

Figure: *Condition of computer lab in schools*

Figure highlights several ICT-related challenges faced by schools: 22 schools report insufficient internet bandwidth or slow speeds, 20 schools lack enough internet-connected computers, and 18 schools have an inadequate number of interactive boards. Additionally, 15 schools have outdated or faulty computers requiring repairs, while 12 schools do not have enough computers, laptops, or notebooks. According to respondents, the most pressing issue is inadequate internet bandwidth, largely due to the high number of students, though schools are attempting to manage this. The shortage of internet-connected computers limits student access to digital learning resources. Despite having interactive boards, their numbers remain insufficient for effective teaching. Furthermore, the lack of technicians makes it difficult to repair outdated or faulty devices, exacerbating the problem of insufficient ICT resources in many schools.

Teachers handling hardware and software issues in the School.

The below figure shows the status of teachers handling hardware and software issues in the school:

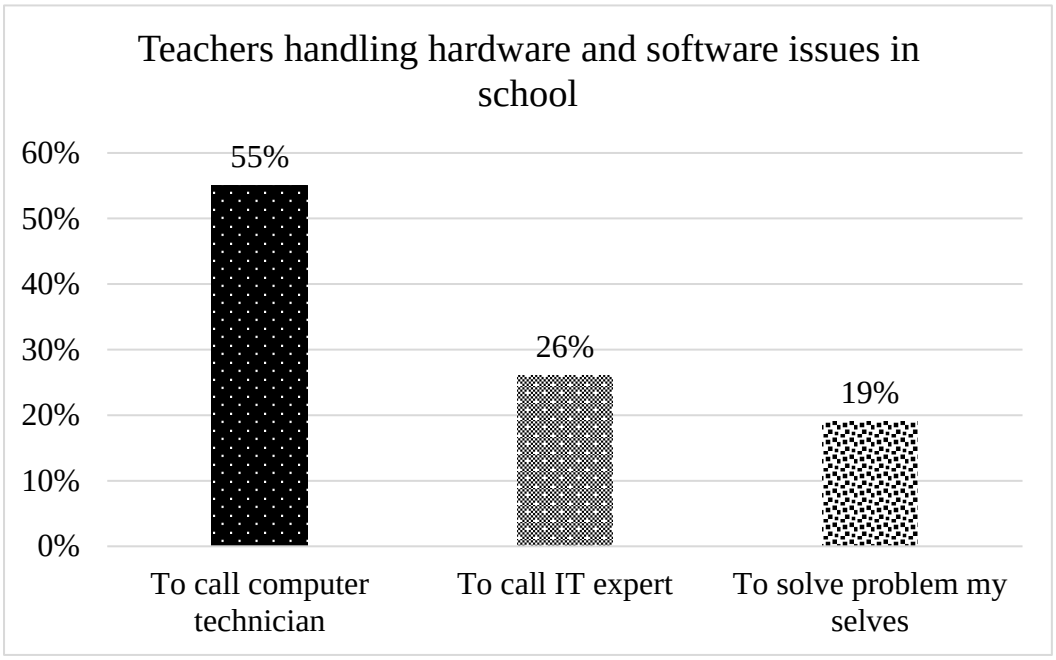

Figure: *Handling Hardware and Software issues in school*

The figure indicates that 55 percent of teachers address hardware and software problems by contacting computer technicians, while 26 percent seek assistance from IT experts and 19 percent resolve issues on their own. Most teachers prefer calling a computer technician for hardware or software repairs or installations. However, some reach out to IT experts, and others resort to online research or instructional videos on platforms like YouTube to fix their problems.

Alternative electricity sources in School

The below figure shows the status of alternative electricity sources in the school:

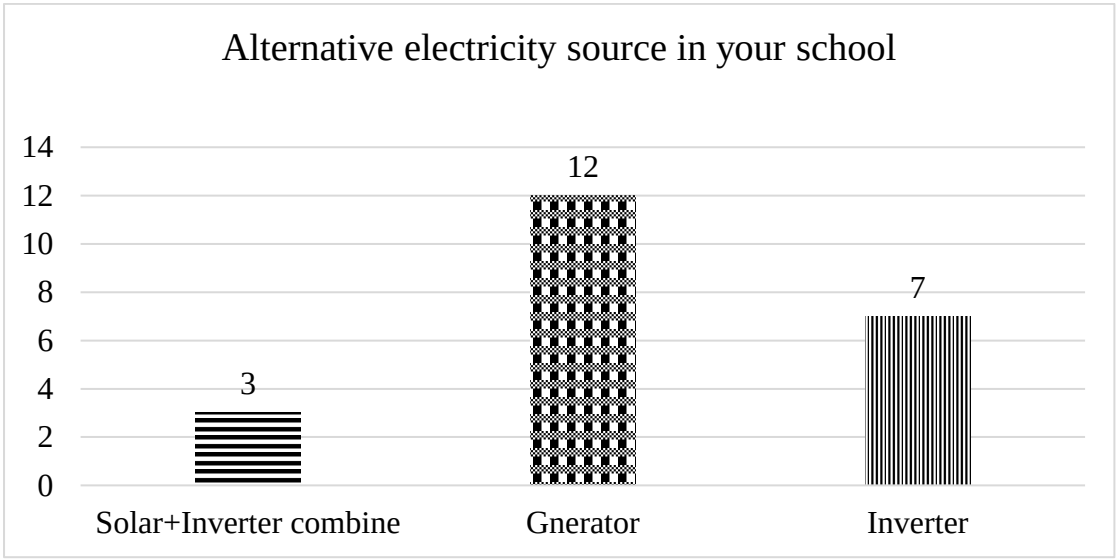

Figure: *Alternative electricity source*

In the given figure, it is evident that 12 schools rely on generators, 7 schools utilize inverters, and 3 schools employ a combination of solar and inverter electricity. The majority of respondents prefer generators as their alternative source of electricity. Additionally, some respondents opt for inverters, while others use a combination of solar and inverter systems to meet their electricity needs

Challenges for integrating web 2.0 tools in teaching and learning activities

The below table shows the status of problems for integrating Web 2.0 tools in teaching and learning activities:

Table: *Challenges for integrating web 2.0 tools*

challenges for integrating web 2.0 tools and technology in teaching and learning	**Number of schools**	**Percentage (%)**
Slow internet connection	11	21 %
hardware and software issues	2	4 %
High cost of technology	5	10 %
Lack of skillful manpower	18	35 %
Lack of training	8	16 %
Lack of infrastructure	6	12 %
If any others	1	2 %

In the table, it is evident that 35 percent of schools are not integrating Web 2.0 tools due to a lack of skillful manpower, while 21 percent face challenges due to slow internet connections. Another 16 percent of schools are held back by a lack of training, and 12 percent struggle with insufficient infrastructure. Additionally, 10 percent of schools cite the high cost of technology as a barrier, 4 percent encounter frequent hardware and software issues, and 2 percent deal with other issues like unmanaged school administration, unfamiliarity, and budget constraints.

According to the teachers, the primary challenge in integrating Web 2.0 tools is the lack of skillful manpower, with insufficient trained ICT teachers and technicians for maintenance and repair. The high cost of some paid versions of Web 2.0 tools makes them unaffordable for many schools, teachers, students, and parents. Furthermore, the lack of updated hardware and software infrastructure makes accessing these tools very difficult. In many local areas, slow internet connections further impede integration efforts. Additionally, some schools face unmanaged administration, preventing effective planning and implementation of Web 2.0 tools and technology.

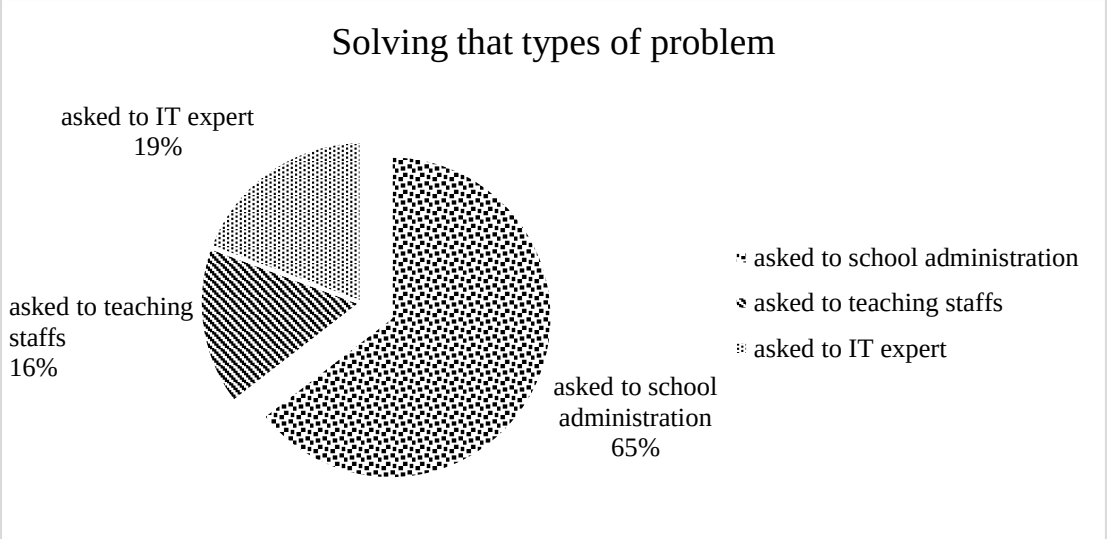

Figure: *solve that type of problem*

The figure highlights that 65 percent of teachers turn to the school administration for problem-solving, while 16 percent seek assistance from teaching staff and 19 percent consult IT experts. This indicates that most teachers prefer to rely on the school administration to address such issues.

Web 2.0 used for teaching and learning activities

The below figure shows the status of Web 2.0 uses for teaching and learning activities:

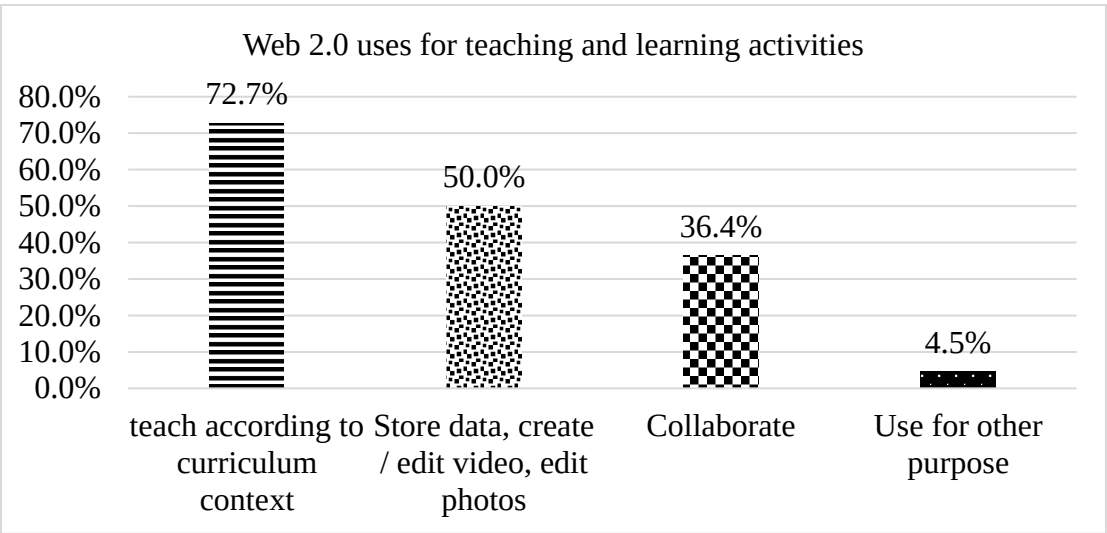

Figure: *Web 2.0 used for teaching and learning*

The figure demonstrates that 72.7 percent of teachers utilize Web 2.0 tools to teach according to the curriculum context, offering additional examples to students. Additionally, 50 percent of teachers use these tools for storing data, creating/editing videos, and editing photos. Another 36.4 percent of teachers use Web 2.0 for collaboration, while 4.5 percent use it for other purposes. The majority of teachers employ Web 2.0 tools not only for curriculum-based teaching but also for enhancing their teaching and learning processes through data storage, multimedia creation, and collaboration.

Facing challenges while using Web 2.0 tools in teaching and learning activities

The below table shows the status of challenges for using Web 2.0 in teaching and learning activities:

Table: *Facing challenges while using web 2.0 tools*

Facing challenges while using web 2.0 tools	Number of schools	Percentage (%)
No proper internet Wi-Fi signal in the school's classroom	14	33 %
No trained teachers	14	33 %
Not enough practical classes	7	17 %
Not enough computers and equipment	7	17 %

The table illustrates the challenges of integrating Web 2.0 tools in schools. It shows that 33 percent of respondents report a lack of proper internet Wi-Fi signals in classrooms, while another 33 percent indicate a shortage of trained teachers. Additionally, 7 percent of respondents mention insufficient practical classes and a lack of computers and equipment. According to the respondents, the issues include inadequate Wi-Fi signals and improper router devices in classrooms. There is also a lack of trained teachers, as many do not have an IT academic background; some computer teachers come from science and English faculties in grades 9 and 10 but have undergone training packages. Furthermore, the lack of an effective routine for practical classes and the large number of students make it difficult to manage these challenges effectively.

Training to use and implement education technology

The below table shows the status of training to use and implement educational technology:

Table: *Training to use and implement education technology*

Training to use and implement education technology	Number of schools	Percentage (%)
The government gives ICT training every year	0	0%
Only one time the government given ICT training	1	4 %
Teachers update their ICT skills themselves	16	70 %
Teachers never get ICT training from the government side	6	26 %

The table reveals that 70 percent of teachers update their ICT skills on their own, while 26 percent have never received ICT training from the government, and 4 percent have received such training only once. Notably, the government does not provide annual ICT training for teachers. Consequently, the majority of teachers rely on self-study to enhance their ICT skills. According to the teachers, they often receive training from various centers and through different training packages. The State Government Ministry of Social Development Education Training Center offers capacity development training related to information technology, but this is not provided on an annual basis.

According to the School Sector Development Plan improvement has been done in your school?

The Government of Nepal developed the School Sector Development Plan (SSDP) for July 2016 to July 2023 period to continue its efforts to ensure equitable access to quality education for all.

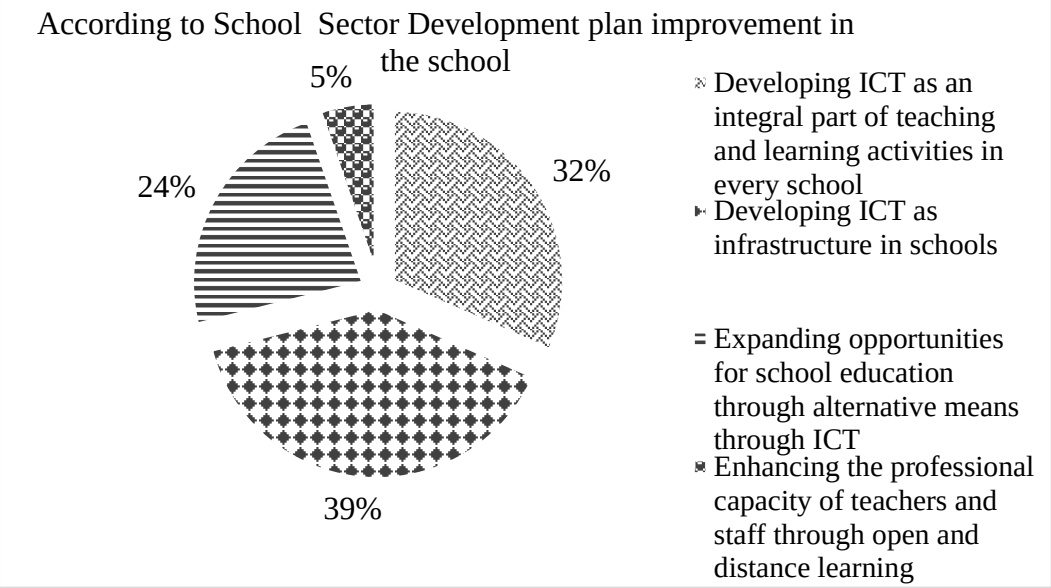

Figure: *School Sector Development Plan improvement in the school*

The table indicates that 39 percent of schools have developed ICT infrastructure through the School Sector Development Plan, marking a significant achievement. Additionally, 32 percent of schools have integrated ICT into their teaching and learning activities, 24 percent have expanded educational opportunities through alternative ICT means, and 5 percent have enhanced the professional capacity of teachers and staff via open and distance learning. Overall, the Government of Nepal's School Sector Development Plan is progressively advancing the development of ICT in schools, focusing on building infrastructure and integrating technology into educational practices.4.2.10 Students have got proper time and resources to use ICT tools in school?

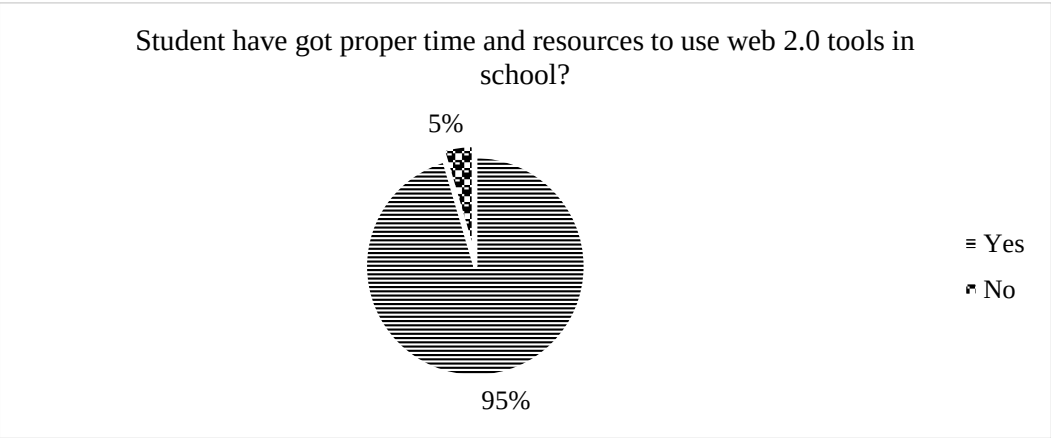

Figure: *Students have proper time and resources to use web 2.0 tools*

The figure indicates that 95 percent of students have adequate time and resources to use Web 2.0 tools in school, while 5 percent lack these due to insufficient computer systems and

devices. In district schools equipped with Web 2.0 tools, students have weekly practical sessions in the computer lab and use these tools during classroom teaching. The majority of students benefit from proper scheduling and prioritization by teachers for using Web 2.0 tools. However, challenges such as power outages, lack of a consistent daily routine, internet disconnections, and malfunctioning hardware and software occasionally hinder their usage.

Conclusions

Teachers and students in the Bhaktapur district have shown considerable enthusiasm for incorporating ICT tools into their educational activities. These tools encompass a wide array of hardware and software, communication and collaboration platforms, delivery and teaching aids, and E-learning systems. By integrating these tools, educators enhance the teaching and learning experience, providing dynamic and interactive lessons. Additionally, Web 2.0 tools facilitate the distribution of homework and assignments, thereby improving communication among teachers, students, and parents. However, several significant challenges impede the optimal use of ICT tools. One of the primary issues is the slow internet bandwidth and the insufficient number of internet-connected computers in schools. Despite the availability of computers and laptops, their potential remains underutilized due to poor management and lack of an effective integration strategy. The shortage of skillful manpower, with many teachers lacking IT backgrounds and proper training, further exacerbates the situation. Consequently, 70 percent of teachers have resorted to updating their ICT skills independently, often without regular government support or training. The study highlights that 33 percent of respondents report inadequate Wi-Fi signals in classrooms, which significantly hampers the use of Web 2.0 tools. Moreover, the large number of students and the absence of structured practical classes make it challenging to ensure that all students can effectively use these tools. Despite these hurdles, 72.7 percent of teachers manage to use Web 2.0 tools in alignment with the curriculum, thereby enhancing the learning process with additional examples and interactive content. The School Sector Development Plan by the Government of Nepal has made commendable progress in developing ICT infrastructure. According to the study, 39 percent of schools have developed ICT infrastructure under this plan. Nonetheless, 53 percent of students still face issues due to large class sizes and insufficient ICT devices, underscoring the need for better resource allocation and management. Moreover, 65 percent of teachers regularly consult with school administration to resolve ICT-related challenges, indicating a reliance on administrative support for integrating Web 2.0 tools. The study also finds that 95 percent of students have adequate time and resources to use Web 2.0 tools, though issues such as power outages, inconsistent daily routines, internet disconnections, and malfunctioning hardware and software occasionally disrupt their usage.

The integration of ICT tools in secondary government schools in the Bhaktapur district, while progressing, is fraught with challenges. The research underscores the necessity for continuous efforts to enhance internet connectivity, provide regular training for teachers, and improve the management of ICT resources. These measures are crucial for maximizing the potential of Web 2.0 tools in enriching the educational experience. The Government of Nepal's ongoing initiatives through the School Sector Development Plan are promising, but sustained efforts are required to ensure that all students and teachers can fully benefit from these technologies. By addressing the identified barriers, schools can better harness the transformative power of ICT to foster a more engaging and effective learning environment.

References

Bola, O. a. (2017). International Journal of Education and Research . *Integrating Web 2.0 Tools into Teaching and Learning Process Through Mobile Devices Technology in Nigerian School*.

Chinn, J. W. (2009). *Using Web 2.0 to Support the Active Learning Experience*.

Christopher, C. E. (2013). Usage, Barriers, and Training of Web 2.0. *Usage, Barriers, and Training of Web 2.0*.

Diyal, S. B., & Pandey, R. (2022). Integration of ICT at Secondary Level School. *INNOVATIVE RESEARCH JOURNAL* , 28-41.

Edcuation, M. o. (2022). School Education Sector Plan 2022/23-2031/32. *School Education Sector Plan* .

Education, M. o. (2009). School Sector Reform Plan 2009-2015. *School Sector Reform Plan*.

Education, M. o. (2016). Government of Nepal Ministry of Education . *School Sector Development plan 2016/17-2022/23*.

Halili, D. S. (2018). The Online Journal of Distance Education and e-Learning. *EMERGING TRENDS OF WEB 2.0 TOOLS IN ADULT EDUCATION*.

Hall, H. (2022, November 30). *Web 2.0 Explained: Everything You Need To Know*. Retrieved from History Computer: https://history-computer.com/web-2-0/

Harrison, C. (2008). *Web 2.0 Technologies for learning at key stages 3 and 4*.

Isyaku Hassan, M. B. (2021). Arab World English Journal. *Challenges and Benefits of Web 2.0-based Learning among International Students of English*.

IT Policy, N. N. (2016). Inforamtion Communication Technology Policy of Nepal-2072. *IT Policy of Nepal 2072*.

Johnson, R. (2016). Challenges and solutions when using technologies in the classroom. *Web 2.0 Technologies*.

MoE. (2022, September 15). *3,475 Schools Selected for the President's Educational Reform Program - 2079/80*. Retrieved from Edusanjal: https://edusanjal.com/news/3475-schools-selected-for-the-presidents-educational-reform-program/

News. (2019, Oct 18). *NTA to Expand Broadband in 5 Districts of Province 1*. Retrieved from New Business Age Information Analysis: https://www.newbusinessage.com/Articles/view/11546

Punie, Y. (2006). *The future of ICT and laerning in the knowledge society*.

Triantafyllou, S. A. (2014). Web 2.0 technologies in education. A brief study. *Application of Web 2.0 in education*.

Alemu, B. M. (2015). Integrating ICT into Teaching-learning Practices: Promise, Challenges and Future Directions of Higher Educational Institutes. Universal journal of educational research, 3(3), 170-189.

Amuko, S., Miheso, M., & Ndeuthi, S. (2015). Opportunities and Challenges: Integration of ICT in Teaching and Learning Mathematics in Secondary Schools, Nairobi, Kenya. Journal of education and practice, 6(24), 1-6.

Andriole, S. J. (2010). Business impact of Web 2.0 technologies. Communications of the ACM, 53(12), 67-79.

Bola, O. a. (2017). International Journal of Education and Research . Integrating Web 2.0 Tools into Teaching and Learning Process Through Mobile Devices Technology in Nigerian School.

Bradley P (2015) Social Media for Creative Libraries: How to Use Web 2.0 in your Library. 2nd edn. London: Facet.

Caliskan, S., Guney, Z., Sakhieva, R., Vasbieva, D., & Zaitseva, N. (2019). Teachers' views on the availability of web 2.0 tools in education. International Journal of Emerging Technologies in Learning (iJET), 14(22), 70-81.

Creswell, J. W. (2012). Educational Research. New York: Pearson.

Dhital, H. (2018). Opportunities and challenges to use ICT in government school education of Nepal. *International Journal of Innovative Research in Computer and Communication Engineering*, *6*(4), 3215-3220.

Dinesh. (2022, 7 31). NTA Completes Free Broadband Internet Project of 5.7 Billion. Retrieved from Nepali Telicome: https://www.nepalitelecom.com/nta-free-broadband-internet-service

Dudovskly, J. (2011, november 26). Research Methodology. Retrieved from

Ebner, M. (2007, April). E-Learning 2.0= e-Learning 1.0+ Web 2.0?. In *The Second International Conference on Availability, Reliability and Security (ARES'07)* (pp. 1235-1239). IEEE.

Faboya, O. T., & Adamu, B. J. (2017). Integrating web 2.0 tools into teaching and learning process through mobile device technology in Nigerian schools: Current status and future directions. *International Journal of Education and Research*, *5*(5), 113-124.

Fırat, E. A., & Köksal, M. S. (2017). The relationship between use of Web 2.0 tools by prospective science teachers and their biotechnology literacy. Computers in Human Behavior, 70, 44-50.

Halili, S. H. (2018). Emerging trends of web 2.0 tools in adult education. The Online Journal of Distance Education and e-Learning, 6(2), 55-60.

Halim, M.S., & Hashim, H. (2019). Integrating web 2.0 technology in ESL classroom: A review on the benefits and barriers. Journal of Counseling and Educational Technology.

Hall, H. (2022, November 30). Web 2.0 Explained: Everything You Need To Know. Retrieved from History Computer: https://history-computer.com/web-2-0/

Hassan, I., BaraU Gamji, M., Yahaya Nasidi, Q., & Latiff Azmi, M. N. (2021). Challenges and benefits of web 2.0-based learning among international students of English during the Covid-19 pandemic in Cyprus. *Arab World English Journal*.

Hiremath, B. K., & Kenchakkanavar, A. Y. (2016). An alteration of the web 1.0, web 2.0 and web 3.0: a comparative study. *Imperial Journal of Interdisciplinary Research*, *2*(4), 705-710.

Horzum, S., Torun, E., Serin, T., & Peeters, F. M. (2016). Structural, electronic and optical properties of Cu-doped ZnO: experimental and theoretical investigation. *Philosophical magazine*, *96*(17), 1743-1756.

Hossain, M. A., Salam, M. A., Shilpi, F., & Officer, A. D. (2016). Readiness and challenges of using Information and Communications Technology (ICT) in higher education of Bangladesh. *The Online Journal of New Horizons in Education*, *6*(1), 123-132.

Inaam, A., & Islamis, J. (2016). Research in social science: Interdisciplinary perspectives.

IT Policy, N. N. (2016). Inforamtion Communication Technology Policy of Nepal-2072. IT Policy of Nepal 2072.

Johnson, J. R. (2016). Challenges and solutions when using technologies in the classroom . Web 2.0 Technologies.

Karahan, E., & Roehrig, G. (2016). Use of web 2.0 technologies to enhance learning experiences in alternative school settings. International Journal of Education in Mathematics Science and Technology, 4(4).

Karki, H. (2019). A brief history of public education, information & communication technology (ICT) and ICT in public education in Nepal. *Deerwalk Journal of Computer Science and Information Technology*, 78-103.

Knatterud, G. L. (1998). Guidelines for quality assurance in multicenter trial.

Majumdar, S. (2015). Emerging trends in ICT for education & training. Gen. Asia Pacific Reg. IVETA.

Ministry of Education, Science and Technology (2022). School Education Sector Plan, 2022/23-2031/32, Kathmandu: Government of Nepal, Ministry of Education, Science and Technology.

MoE (2013). Master Plan, Nepal 2013-2017. Kathmandu: Ministry of Education, Government of Nepal.

MoE (2016). School Sector Development Plan, Nepal, 2016/17–2022/23. Kathmandu: Ministry of Education, Government of Nepal.

MoE. (2022, September 15). *3,475 Schools Selected for the President's Educational Reform Program - 2079/80*. Retrieved from Edusanjal: https://edusanjal.com/news/3475-schools-selected-for-the-presidents-educational-reform-program/

Naresh, B., & Reddy, B. S. (2015). Challenges and opportunity of E-learning in developed and developing countries-a review. *International Journal of Emerging Research in Management &Technology*, *4*(6), 259-262.

News. (2019, Oct 18). *NTA to Expand Broadband in 5 Districts of Province 1*. Retrieved from New Business Age Information Analysis: https://www.newbusinessage.com/Articles/view/11546

NTA to Expand Broadband in 5 Districts of Province 1. (2019, Oct 18). Retrieved from New Business Age: https://www.newbusinessage.com/Articles/view/11546

O'reilly, T. (2005). Web 2.0: compact definition.

Ohei, K. N., & Brink, R. (2019). Web 3.0 and web 2.0 technologies in higher educational institute: Methodological concept towards a framework development for

Okello-Obura, C., & Ssekitto, F. (2015). WEB 2.0 technologies application in teaching and learning by MAKERERE UNIVERSITY ACADEMIC STAFF. Library Philosophy and Practice, 0_1.

O'Reilly, T. (2006, December 10). Web 2.0 Compact Definition: Trying Again. Retrieved from O'Reilly Radar: http://radar.oreilly.com/2006/12/web-20-compact-definition-tryi.html

Ozcinar, Z., Sakhieva, R. G., Pozharskaya, E. L., Popova, O. V., Melnik, M. V., & Matvienko, V. V. (2020). Student's Perception of Web 2.0 Tools and Educational Applications. International Journal of Emerging Technologies in Learning, 15(23).

Pangeni, S. K. (2016). Open and distance learning: Cultural practices in Nepal. European Journal of Open, Distance and E-Learning (EURODL), 19(2), 32-45.

Patel, K. (2013). Incremental journey for World Wide Web: introduced with Web 1.0 to recent Web 5.0–a survey paper. *International Journal of Advanced Research in Computer Science and Software Engineering*, *3*(10).

Rahmawanti, M. R., & Umam, A. (2019). Integrating web 2.0 tools in writing class to promote assessment for learning. *JEES (Journal of English Educators Society)*, *4*(2), 53-59.

Ratheeswari, K. (2018). Information communication technology in education. Journal of Applied and Advanced research, 3(1), 45-47.

Regoniel, H. T. (2015, january 5). CONCEPTUAL FRAMEWORK HANDBOOK FOR BEGINNING RESEARCHERS. Retrieved from SimplyEducate.Me: https://simplyeducate.me/2015/01/05/conceptual-framework-guide/Assessment for Learning. JEES (Journal of English Educators Society).

RSS. (2021, 7 29). Nepal's 91% of the population have access to the internet: Regulator. Retrieved from Online Khabar: https://english.onlinekhabar.com/nepals-91-of-the-population-have-access-to-the-internet-regulator.html

Rumanyika, J. D., & Galan, R. M. (2015). Challenges for teaching and learning information and communication technology courses in higher learning institutions in Tanzania: A review.

Sadaf, A., Newby, T. J., & Ertmer, P. A. (2012). Exploring factors that predict preservice teachers' intentions to use Web 2.0 technologies using decomposed theory of planned behavior. *Journal of Research on Technology in Education*, *45*(2), 171-196.

Sailin, S. N. (2015). Preparing student teachers to integrate web 2.0 technology in their T&L through meaningful learning.

Selwyn, N. (2015). Challenging educational expectations of the social web: a web 2.0 far?. Nordic Journal of Digital Literacy, 10(Jubileumsnummer), 72-84.

Sharma, G., & Bhatta, M. (2018). Implementing e-learning in far western region of Nepal. *Advances in Computer Sciences*, *1*(3).

Shuen, A. (2018). *Web 2.0: A Strategy Guide: Business thinking and strategies behind successful Web 2.0 implementations*. O'Reilly Media.

Singh, K. P., & Gulati, D. I. P. T. I. (2011). Technological March from Web 1.0 to Web 3.0: a comparative study. *Library Herald*, *49*(2), 146-157.

Sivarajah, U., Irani, Z., & Weerakkody, V. (2015). Evaluating the use and impact of Web 2.0 technologies in local government. *Government information quarterly*, *32*(4), 473-487.

Sivarajah, U., Weerakkody, V., & Irani, Z. (2016). Opportunities and Challenges of using Web 2.0 Technologies in Government: A Conceptual Review.

Solanki, M. R., & Dongaonkar, A. (2016). A Journey of human comfort: web 1.0 to web 4.0. International Journal of Research and Scientific Innovation (IJRSI), 3(9), 124-134.

Suluai-Mahuka, S. K. (2022). The Influence of Web 2.0 Tools on Collaborative Learning for Secondary Education Students in American Samoa (Doctoral dissertation, University of Hawai'i at Manoa).

Taherdoost, H. (2016). The questionnaire is one of the most widely used tools to

Tatli, Z., Akbulut, H. İ., & Altinisik, D. (2019). Changing Attitudes towards Educational Technology Usage in Classroom: Web 2.0 Tools. *Malaysian Online Journal of Educational Technology*, *7*(2), 1-19.

Yadav, A. K., & Vohra, N. (2016). Students' Usage and Experiences of Web 2.0 Technologies. *Library Herald*, *54*(1), 64-81.