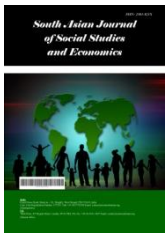

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Status of Nepalese Education Institution on Technical Adaption in COVID-19 Pandemic: An Index Based Analysis

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Authors' contributions

This work was carried out in collaboration among all authors. Authors ND, BA and URP designed the study. Author BA performed the literature search, developed methodology, performed first round data analysis and wrote the first draft of the manuscript. Authors DBA and SP assist BA in the preparation of first draft. Authors ND, DBA and URP wrote the second draft of the manuscript. All authors read, finalized and approved the final manuscript.

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ABSTRACT

With the rapid technological advancement throughout business sector, education sector has not been untouched by it. Education institutions are in the phase of being digitalized which more have been encouraged post COVID-19 in Nepal as well. This study thus aims to explore readiness of Nepalese education institution on technical adaption. Descriptive study has been conducted where 300 school teachers have been surveyed for this study. The results revealed that almost all the school teachers are ready to adapt digitalized education system given different dimension. It was also found that teachers are highly aware regarding the adoption of technology in schools. Likewise, 49.9% teacher's willingness to adopt digital teaching learning practice has increased

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after COVID-19. Thus, this study concludes that 90% of teachers are willing to adapt digital technology in educational system of Nepal. Therefore, feasible environment, infrastructure that fits digital teaching pedagogy, digital friendly curriculum are recommended to be set for increasing the effectiveness of teaching practice with digital technologies.

Keywords: Nepalese education institute; technical adaption; school teachers; readiness.

1. INTRODUCTION

The transition in the education system was parallel to the humankind as well as the technological revolution as there has been increasing issues in the education system around the globe [1]. Internet affects the perception of people that somehow this technological change has affected not only people's lifestyle, but also the education system [2]. The development of information and communication technologies (ICT) has resulted in the education system being digitized [3]. The technology giant embraces the demand in global education market including less developed regions of Asia, Africa and Latin America's [4]. But, the effect on education of these developments poses enormous obstacles for online learning teachers and students. Teaching and learning occur differently in an e-learning setting than in a traditional school, which poses a new challenge for teachers and learners working in the online learning environment [5]. Teachers face challenges in technology adapting to online teaching in COVID-19 [6]. However, pandemic has had a catalytic effect on the changes in educational process worldwide 9 [7-9].

In this dynamic world, it's a necessity to analyze the perceptions of each professors and learners towards technologies changes, as a result of which it is believed that it affects the development of learning and interaction among learners and teacher [10]. The change in the education system helps to explore how students' learning designs influence students' learning satisfaction with totally different e-learning instruction methods (Wang, 2013).The future of educational systems with developing technologies and to form the consciousness such forces have an effect on in new educational circumstances [11]. As the education system is changing it connects everybody globally with wider vision and keeps change faster [12]. The new education system helps to learn through the new social media environment, and it's essential to be aware and knowledgeable about the social media. As today even graduates are recruited with the help of social media platforms [13].

The changes within the social economy are evolving steady where the adoption of cyber-physical systems and industry 4.0 technologies, below the teaching factory paradigm can re-shape manufacturing education, addressing the exaggerated need for highly skilled staff [14]. Traditionally geared towards the Indian method, the Nepalese education system was classified as the three-tier sixteen-year education system and 2 years of master's study [15]. Throughout recent years, several government schools have embraced new technology to bring improvement to current teaching strategies throughout classroom teaching and learning [16]. Though there are various researches conducted about academic quality, its standard and many other factors of education in different part of the globe. The study on readiness for education 4.0 is first study in Nepalese context.

This research helps to identify the level of understanding of people regarding the use of technologies in learning. It also provides an understanding about different determinants and challenges faced by educational institutions in the acceptance of technologies in education. This study is organized into four sections. Second section includes methods used in this study. Third section covers results followed by conclusion in fourth section.

2. METHODS

2.1 Research Design, Study Area and Sampling

This study deploys descriptive research design to identify status of Nepali education institution's technical adaptation during COVID-19 as it is not well researched before in the context of Nepal. 300 teachers, of all types' schools from grade 1-12, from all the three categories- government, private and community schools located in Lalitpur districts were selected as respondents for this study. Following formula used by Isreal (1992) was used determine sample size for the study i.e. $n_0 = z^2 pq/l^2$. Here, n_0= sample size required for study, Standard tabulated value for 5% level of significance (z) = 1.96, p= prevalence or

proportion of an event 50 % = 0.50 (More et al., 2012). So, P= 0.5 and q= 1-p, = 0.5.Allowable error that can be tolerated (e) = 5%. Thus, sample size taken for study was 300.

2.2 Data Collection and Analysis

The research is based on qualitative analysis where the data is collected from primary and secondary sources. Primary sources include observation, expert opinions, and questionnaire whereas secondary source includes reports and documents from different agencies. Structured questionnaire with the help of KOBO collect Toolbox was used to collect information from the respondents. Pre-test was conducted with 20 respondents (5% of determined sample) to verify sufficiency and relevancy of questionnaire. Finally, data was collected through interview method with respondents. The data are analyzed using descriptive method.

3. RESULTS AND DISCUSSION

This section includes various results generated from the data collected from respondents. Readiness of schools towards technical adaption was analyzed throughout this section.

3.1 Readiness of Education Institution Regarding Technical Adaption

Readiness of education institutions to adapt technologies is described in this part of the study. Readiness to adapt the technology in education is analyzed from four dimensions namely, optimism, insecurity, innovation and discomfort [17]. The respondents were questioned accordingly in order to analyze their readiness of education institution regarding technical adaption.

It has also been discussed by different scholars regarding four factors that helps to identify readiness of technical adaption in education system (In & Chools, 2017) [18]. Today's students and teachers can easily adapt to technology which might be result of rapid technological development [19]. The respondent's reaction based on optimism to the freedom of movement offered by modern technologies is 99 percent. The teachers responding the questionnaire prefer use of digital technology as 94 percent believe that it increases productivity and 92 percent prefer use of digital education as it helps to increase efficiency in delivering knowledge. However, 51.16 percent believe that the course content is not as per the standard to use digital technology. Kim et al. [20] stated that though technological adaptaion are perceived positively students and teachers must have strong digital knowledge to perform academic activity and promote e-learning.

Another important dimension analyzed was innovativeness. Under this, the table reveals that 75 percent of the respondents prefer to use advanced technologies for digital learning. 84 percent of the respondents believe that new technologies to be mentally stimulating and 89 percent believes that learning about technology can be as rewarding as the technology itself for the teachers as well. Similarly, the table also puts forward some findings under insecurity dimension which portrays that 93 percent of the respondents have insecurity that the students, teachers be too dependent on technology that it is harmful to them. 84 percent of the respondents believe that the technology might lower the quality of relationships by reducing personal interaction as learning goes digital. However, study conducted by Salloum et al. [21] revealed that innovativeness does not have significant influence in e-learning activities.

Lastly, the Table 1 also analyzes the readiness based on the discomfort to use digital education in learning by schools. 44 percent feel discomfort to use digital technologies in teaching learning process as schools don't provide enough budget or space for E-learning. 82 percent respondents feel that there should be caution in replacing important people tasks with technology because new technology is not dependable and it always seems to fail at the worst possible time. 73percent respondents feel that there is no appropriate government rules and regulation for digitalizing education which makes the schools not to have any proper rules for the acceptance of the technology in education.

3.2 Readiness Index

This section deals with the readiness of education institution regarding technical adaption. Awareness was measured taking various variables into consideration. A study conducted by Sabir et al. [22] has indicated that organizational learning capacity and readiness to adapt changes has full impact on organizational citizenship behavior of teachers. Fig. 1 showcase awareness level generated from the different

components such as optimism, innovativeness, insecurity, discomfort. The index is categorized into high, low and moderate. 0-49 is considered as low, 50-74 as moderate and 75 and above as high. Readiness index here has been prepared and discussed on the basis of different schools classified such as government school, private school, community based and international affiliation.

3.3 Optimism Index

Optimism Index represents an assumption or expectation that the end effect will be positive and beneficial. It deals with the assumption of teachers that the education system is ready to adapt different technologies in teaching learning process (In & Chools, 2017). Therefore, Chao et al. [23] mentioned that optimism have relatively significant influencing in e-learning process. It further deals about the belief of teachers whether digitalization provides freedom of mobility, increases productivity of teachers or not by increasing efficiency in delivering knowledge and whether or not the course content as per the standard to use digital technology in Nepal. The Fig. 1 shows that the optimism level of teachers regarding the readiness to adapt the digital technologies in education is high i.e. 87%. The result also revealed that schools affiliated with international organizations (100%) have positive impact of adaption of digital education in teaching learning. Similarly 89.4% private schools believe that schools are ready to adapt technology in education. Likewise, 73.5 % government schools and 84.2% community schools are ready to adapt technology in education.

3.4 Innovation Index

Innovation Index deals with creating new value and/or capturing value in a new way. It depicts whether use of advanced technologies is preferable and mentally stimulating or not, whether teachers can use digital technologies in teaching learning process and create value through it and have an acceptance for the adaptability of the technologies [24]. It further talks whether learning about technology can be as rewarding as the technology itself or not. It deals with the belief of teachers based on the different schools they are associated regarding the value that can be created by the use of technologies in the teaching learning process. Fig. 1 discusses about the perception regarding the value created by the technology adaption in education. Result unleashed that level of awareness regarding the value that technologies create to adapt it in education is moderate (52.6%) as teachers believe that the technologies help to create value in the teaching learning process. It was also found that teachers associated with the international affiliated, private and community based schools believe that high value can be created by making education digitalized i.e. 100%, 56.5% private school teachers, 42.1% community based school teachers and 35.3% community school teachers. Likewise 38.2% government school teachers believe that moderate impact on value creation can be witnessed by adopting technology in education.

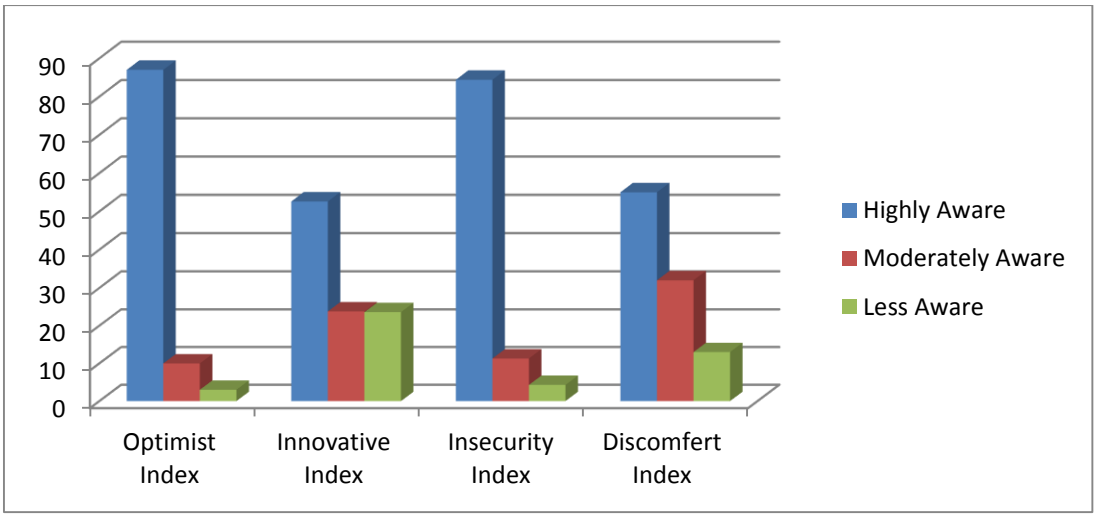

Fig. 1. Awareness on Adoption of Technology

Table 1. Readiness of education institution regarding technical adaption

Dimensions and Items	Yes	in %
Optimism		
Do you think using technology in education gives more freedom of mobility?	297	99
Does digital technology make teaching more productive?	284	94
Technologies allows to tailor things to fit my own needs	282	94
Technology makes me more efficient in delivering knowledge	277	92
It gives confidence when technology-based systems are installed by schools itself.	286	95
Is the course content as per the standard to use digital technology?	147	49
Innovativeness		
In general, I am among the first in my circle of friends to acquire new technology when it appears	146	49
I can usually figure out new high-tech products and services without help from others	178	59
I keep up with the latest technological developments in my areas of interest I enjoy the challenge of figuring out high-tech gadgets	204	68
Fewer problems are faced than other people in making technology work for me.	221	73
Usage of most advanced technology available is preferable.	226	75
New technologies to be mentally stimulating.	252	84
Learning about technology can be as rewarding as the technology itself.	267	89
Insecurity		
People are too dependent on technology to do things for them	279	93
Too much technology distracts people to a point that is harmful	272	90
Technology might lower the quality of relationships by reducing personal interaction	254	84
Information available over the Internet may be misleading and does not involve creativity in teaching	246	82
Whenever something gets automated, you need to check carefully that the system is not making mistakes	282	94
Discomfort		
Schools don’t provide enough budget or space for E-learning.	210	70
If you provide information to a technology-based system, you can never be sure it really gets to the right place.	244	81
It feels discomfort learning more about the newest technologies	131	44
There should be caution in replacing important people tasks with technology because new technology is not dependable	248	82
Technology always seems to fail at the worst possible time	227	75
Many new technologies have health or safety risks that are not discovered until after people have used them	261	87
While using high-tech product or service, I prefer the basic model over one with a lot of extra features.	251	83
Are there appropriate governmental rules and regulations for digitalizing education?	80	27

3.5 Insecurity Index

Insecurity Index deals with the sense of confusion, a loss of confidence, in the use of technologies in the education system. It deals with unease to adapt technologies in the education system. It also discusses whether teachers believe that technologies can make people too dependent on technologies and distract to a point that can be harmful to the users and deteroit relation between teacher and students with low personal interaction [25]. It deals with the belief of teachers based on the different schools they are associated regarding the loss of confidence to use technologies in the teaching learning process. Fig. 1 revealed that respondents feel highly insecure (84.4%)while using technology in education. The study showcased that private (89.5%), government schools (85.4%)and community based (82.4%) school teachers lack confidence in the use of technology which is due to the fact that information available over the internet may be misleading and does not involve creativity in teaching. Whereas, the teachers associated with the international affiliated schools believe that the insecurity in using technology is moderate as sometimes when thing gets automated, you need to check carefully that the system is not making mistakes and can make people too dependent on technology that can be harmful.

3.6 Discomfort Index

Discomfort Index discusses about the inconvenience that the respondents face in order to adapt the technologies in the education system [26]. It also deals with either school provide enough budget or space for E-learning or not, the discomfort teachers feel to learn about new technologies and the technologies make more dependable and fails at the worst possible time, discomfort that teachers face due to the advanced technologies and the government rules for digital technologies is appropriate or not in Nepal and readiness of teachers to adapt technology in education despite the discomfort they face in using it for teaching learning activities. Fig. 1 shows that the discomfort to use technology is high in the teachers of Lalitpur area. There is a high discomfort to adapt technology i.e. 55%. Similarly, 32% respondents feel that discomfort to adapt technology is moderate and can be overcome by the proper guidance and space provide by schools. Whereas only 13% feel that the discomfort or inconvenience to use the technology in education is low. Result shows that the teachers associated with the international affiliated schools have low discomfort to adapt technologies in education than that of other schools. The highest discomfort faced by is 70.6% of government school teachers in order to adapt technology in education which is due to lack of budget or space provide by schools. Similarly, 54.1% of private school teachers and 47.4% of community-based teachers feel discomfort to adapt technologies in education.

3.7 Use of Digitalization in Teaching

Digitalization is increasing in teaching-learning. It is further believed that digitalization motivates students to complete their tasks, makes easy in assessment of tasks [27]. Fig. 2 illustrates the use of digital technologies in teaching learning process after COVID-19. It shows the respondents perspective regarding the use of digital technologies in the education. The result shows that use of teachers using technology before the pandemic was moderate. They only used it occasionally which made the use to be moderate i.e. out of 300 respondent 137 had moderately used technologies in teaching learning process where as 92 respondents out of 300 used it low before the pandemic hit. Similarly, after the pandemic the number of teachers willing to use technologies in learning teaching process has been increased. The teachers are more willing to use technologies in education which shows that out of 300 respondents 147 are highly willing to use technologies and the interest of teachers in use if technologies in teaching learning process have increased after COVID-19.

3.8 Digitalization after COVID

According to Skulmowski & Rey [28] because of COVID-19 schools and colleges quickly adopted to digital teaching-learning methodology. In this section the respondent's response regarding the use of digital technologies in teaching after COVID-19 is discussed. It shows that the respondents are willing to accept the technologies or not after COVID-19.

90% teachers are willing to accept the use of technologies in education even after the pandemic. There are only 10% out of 300 respondents that are willing to accept and out which more are in the time of their retirement and also the government schools' teachers feel that schools don't provide such budget to continue such after the pandemic.

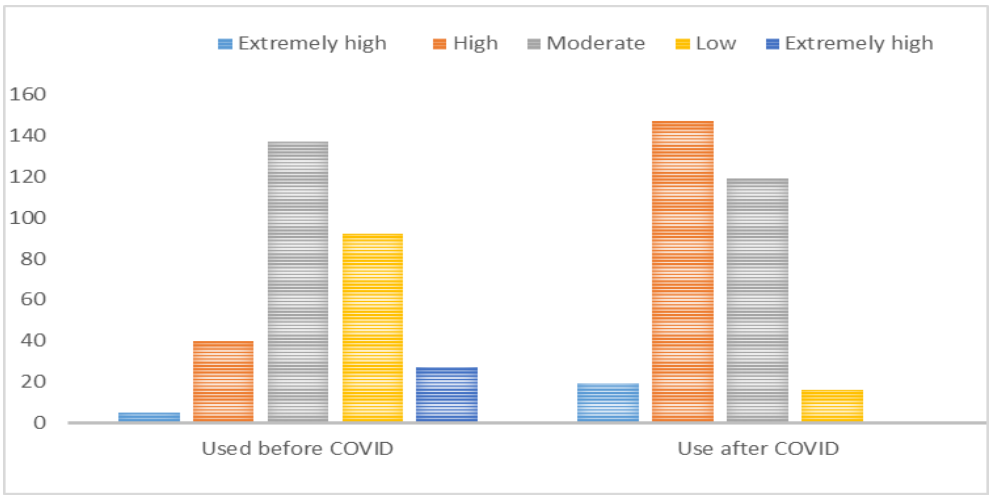

Fig. 2. Digitalization before and after COVID-19

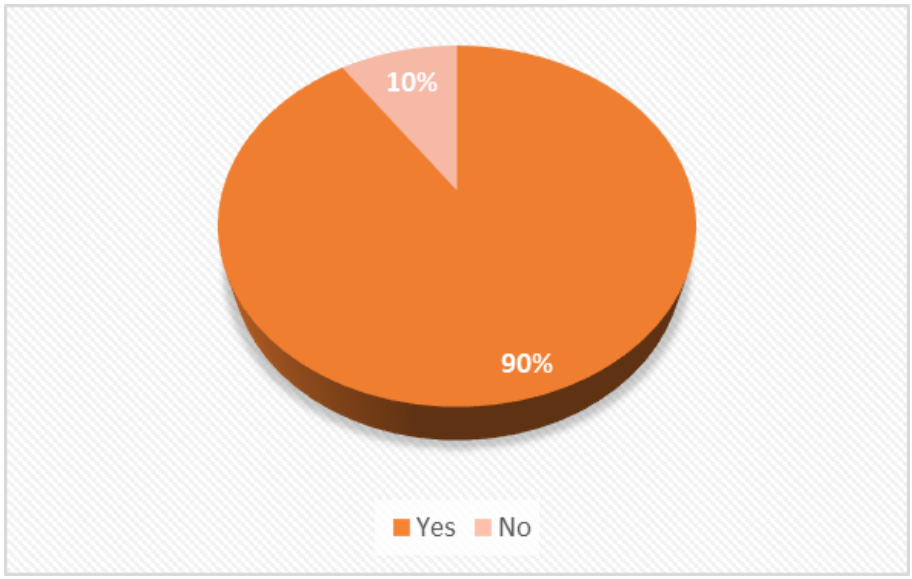

Fig. 3. Digitalization after COVID-19

3.9 Challenges

As this study also focused on understanding about different determinants and challenges faced by educational institutions in the acceptance of technologies in educational sector various challenges was analyzed in this study. With the mitigation of the mentioned and identified challenges the status of techno friendly education system in Nepal can be enhanced and upgraded.

It shows that 95.02 percent of teachers feel that there are challenges for adoption whereas 4.98 percent feel that there are no any challenges for education institution for adoption of technologies in education. The major challenge to adapt technologies in education is to provide proper training to the teachers i.e. 47.2% which will help to raise standard of teachers teaching learning process for which there needs to be a curriculum upgrading. Respondents of 24.4% believe that the ICT based curriculum and policies needs to be made for the adaption of the digital education in teaching learning process. Similarly, 16.3% believe that education standard needs to be raised in order to have education system that supports the technologies adaption in education whereas, 12.2% of respondent believe that the awareness needs to be increased to have a proper understanding regarding the use of technologies in education to improve the efficiency of the students.

Table 2. Challenges

	Number	Percentage
Are there any challenges regarding the adoption of digital education in learning?		
Yes	286	95.02
No	15	4.98
What are the challenges for education institution for adoption of technologies?		
Lack of / or inadequate willingness to accept new technology in learning	134	44.51
Lack of/ or inadequate awareness and access to high-tech by all schools	148	49.12
High Cost to adopt tech-based education	127	42.19
Lack of ICT based curriculum	171	56.81
Lack of/ or inadequate government policies to incorporate digitalization in learning	157	52.16
Why do you think education system has not been able to adopt education 4.0?		
Lack of awareness	37	12.29
Lack of curriculum updating	49	16.28
Do not feel the need of change	73	24.25
Lack of proper training to the teachers	142	47.18

3.10 Managerial Solution for Enhancement of Technical Adaptation in Nepal

In this area it discussed about the managerial solution regarding the potentiality of technical accessibility in education.

3.10.1 Factors for long-term changes in education system

In this section the factors that policymakers and other related actors can do to help to have long-term changes in education system is discussed along with some of the factors that needs to be changed in order to have a updated and technology friendly education system. In Fig. 4, it shows that the respondents believe to have changes in the factor that helps to have an easy adaptability of education 4.0 or have an effective change in the system. 37.9 percent of the respondents believe that the policymakers and other related actors needs to include compulsory technology-based learning in the education in order to help to have long-term changes in education system and 25.2percentbelieve that the policies need not only be made but have a proper implementation of it and make proper checking either IT based learning is practiced by schools or not. Similarly, 24.4 percent and 12.6 percent respondents believe that the government needs to provide proper technical support to the schools that are not financially able and have a proper training to the teachers as well for proper adaption and also make teachers, school management understand the importance and effectiveness of technologies in education.

3.10.2 Responsible for the changing the education system

Fig. 5 discusses about the stakeholder's responsibility for the changing the education system in consistent to the changing world. It shows the relation among stakeholders such as education ministry, school, and central government. Fig. shows that 120 out of 300 respondents thinks that education ministry holds major responsibility to have changes in education system towards being technically enabled whereas 75 out of 300 respondents feels that it needs to be the responsibility of all the three stakeholders i.e., education ministry, schools, and the central government to enhance technological educational system. Understanding and accountability of all three stakeholders can bring a significant change in education system of Nepal.

3.10.3 Curriculum for education 4.0 system

In this section, different factor that needs to be considered in order to have a proper curriculum for adaption of technology is discussed. Fig. 6 shows that the 53.3 percent respondents believe that the curriculum needs to be more practical and interactive. The curriculum should be developed in such a way that it focuses more on practical based knowledge and student friendly. 23.3 percent stated that curriculum should be ICT supportive whereas 13.3 percent believe that it should be research based which will help not only students to have more learning but also encourages teachers to research more and provide knowledge in any matter. Whereas, 10 percent believe that curriculum should be more creativity initiating and more interactive.

3.10.4 Infrastructure should be developed

The infrastructure that should be implemented for the development of education 4.0 in the education system are discussed below. 40 percent of the respondents believe that the schools needs to have wireless network in order to have a proper functioning of the different internet facilitates in the teaching learning process. 36 percent of the respondents believe that there should be smart boards in classrooms which will make easy connectivity with the school network for which 34 percent believe that schools need to provide projectors and laptops to each class in schools in order to have easy connection with smart boards. Similarly, 10 percent respondents believe that schools need to have well equipped labs for practical and effective learning.

3.10.5 Attributes benefitting the institution

Fig. 8, shows the attributes benefitting the institution from digital learning. It shows different factors that help schools to have benefit through the use of technologies in education. 29.5 percent of the respondents believe that it helps school to have personalized learning environment which will make it easy to have access to the technology. Further, 18.7 percent believe that due to increase in the use of technologies in education it helps to have a high success rate of schools which would help to increase status of schools. 23.3 percent of the respondents believe it increases the standard of learning and make learning more effective and

efficient. Similarly, 13 percent of the respondents believe that adaption of technologies in the education helps to have self- directed learning which will increase a research habits in children and encourages having a more learning and understanding habits.

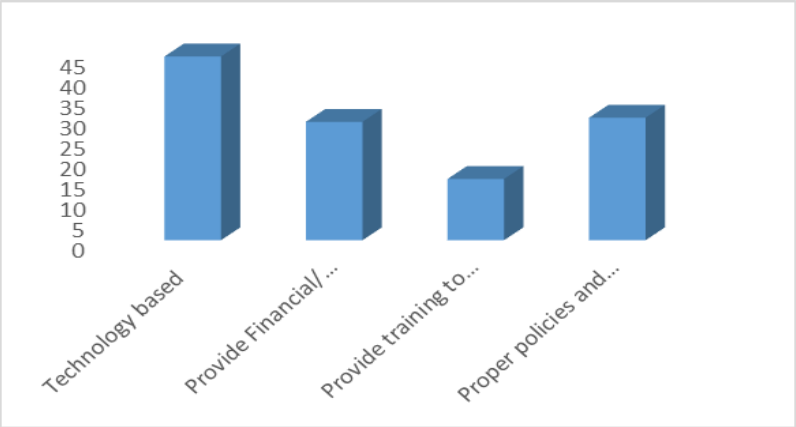

Fig. 4. Factors for long-term changes in education system

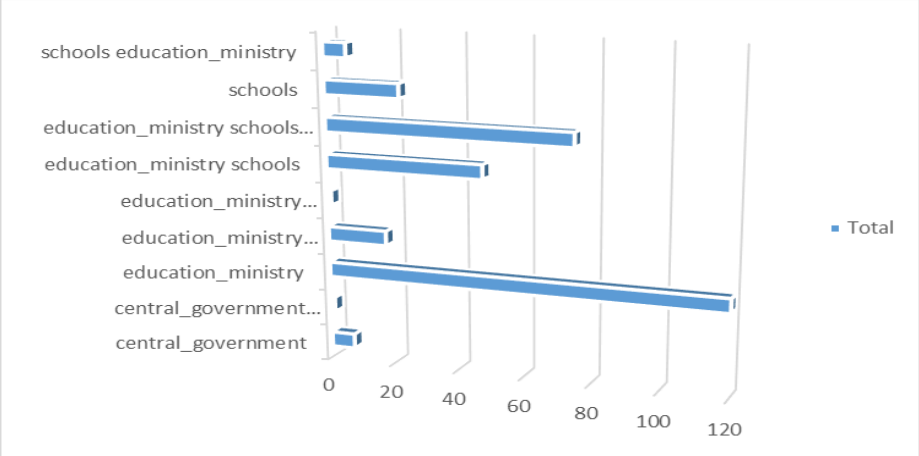

Fig. 5. Responsible for the Changing the Education System

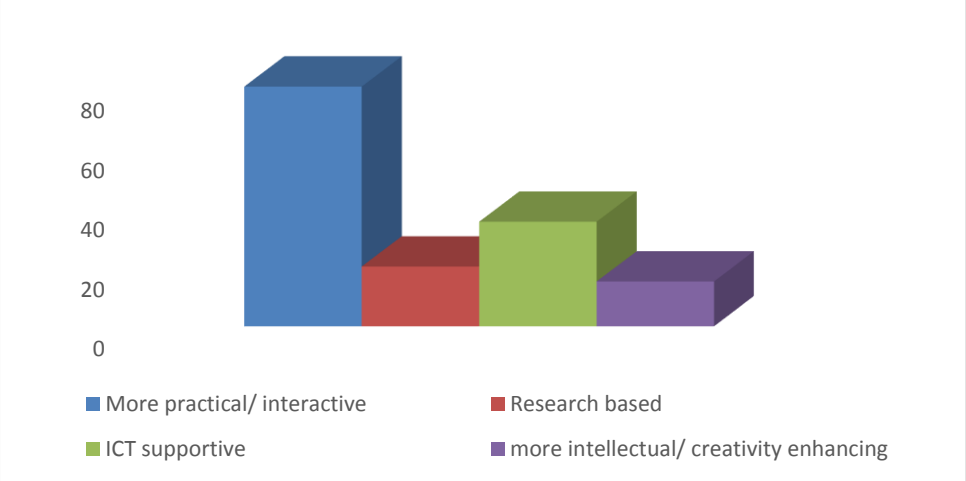

Fig. 6. Curriculum to be Developed Education 4.0

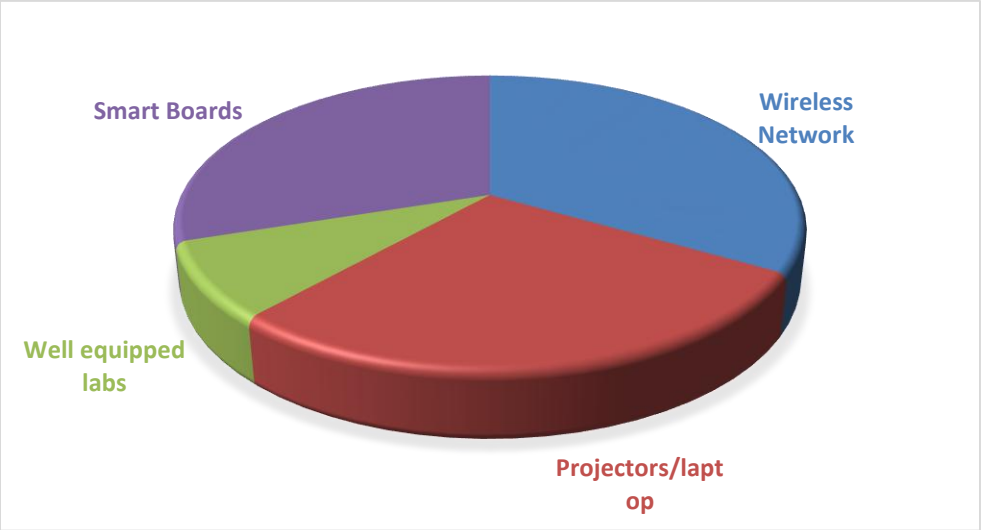

Fig. 7. Infrastructure to be developed

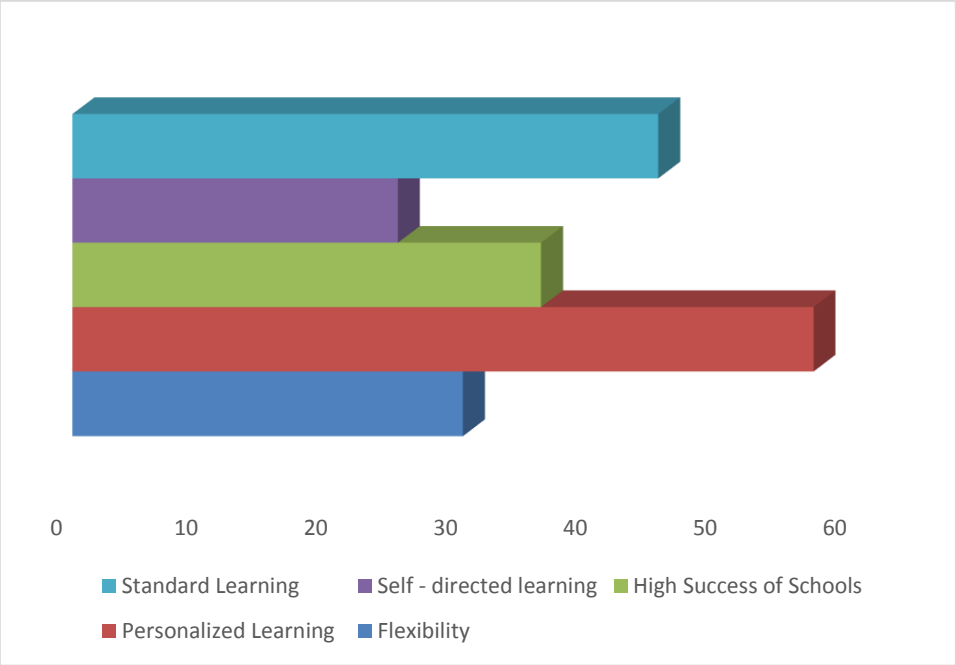

Fig. 8. Attributes benefitting institution

4. CONCLUSION

As this study focused on readiness of Nepalese education institution on technical adaption it was found that almost every teachers from international affiliated school, private, government and community based schools are ready and willing to adapt technological changes in education system of Nepal. According to Adhikari et al. [29] technical adaptation is not an easy task in educational institutions of developing countries like Nepal as they even lack local resources of teaching in most of the part of the country. Though technological use in teaching learning practice was less in schools before COVID-19 it has significantly increased by 49% post COVID-19. Further, they are also willing (90%) to continue digital practice of teaching learning post COVID-19. However, 95.02% teachers also felt that there are challenges to adopt digital technology in teaching. In order to mitigate those challenges and for the sustainable digital practice in education system infrastructural development

that supports digital teaching learning practice, curriculum that fits digital teaching learning pedagogy are recommended by teachers.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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