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Pedagogical Use of 21st Century Skills in Nepal

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Abstract

This paper presents a survey study on university faculties in Nepal about the understanding and pedagogical use of 21st century skills. The purpose of the study on use of 21st century skills in pedagogy by teachers is to understand how these skills can be effectively integrated into teaching and learning practices. This research helps to identify the existing practices for incorporating 21st century skills into instruction and can inform for the betterment in the development of teacher training and professional development programs to ensure that teachers are equipped with the knowledge and skills they need to effectively prepare students for success in the 21st century world. Both quantitative and qualitative information are used to investigate how Nepalese university teachers apply 21st century skills into their teaching to support students learning. The data were collected through online survey questionnaire among 309 participants followed by semi-structured interview with 14 participants. Based on the data analysis, it was found that higher education institution teachers in Nepal are using moderately using 21st century skills in pedagogical activities. Supporting with necessary digital tools and applications; institutional policy and guidelines; and continuous professional development programme can further enhance teachers 21st century skills use in pedagogical activities.

***Keywords**: 21st century skills, digital pedagogy, teacher education, Tribhuvan university*

Introduction

The interconnectedness of globalization, ICT innovation and its educational networks require a student learn to communicate, collaborate, and solve problem with people worldwide. As Levy and Murnane mentioned that todays' learner need complex thinking and communication skills (Levy & Murnane, 2007), these skills are commonly referred as higher order thinking skills, deeper learning skills and 21st century skills in general.

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The public belief on pedagogical use in higher education institutions (HEI) is mostly dominated by transmission model: through which teachers only transmit factual knowledge to students via lectures and textbooks. The transmission model is a dominant approach to education in the most part of the world (OECD, 2009), through which students can only learn information, but typically do not have much practice applying the knowledge into contexts. This belief is also seen in literature that students are also not developing the required 21st century skills because they are not being explicitly taught (Schleicher, 2015).

21st century skills have been a focused agenda of educational reform in several countries including Nepal. In Nepal, number of plans and policies have been built and created a foundation for student-centred teaching learning approach to support 21st century skills. Among several, Tribhuvan University (TU), Nepal Open University (NOU) from Nepal and two Finnish higher education institutions, Jamk University of Applied Sciences (JAMK) and Hamk University of Applied Sciences (HAMK), are working on "Developing pedagogy for 21st Century skills in Nepal (21stCS Nepal)" to enhance the capacity of Nepalese teachers on using 21st century skills focusing on digital pedagogy**.** With this context, the research questions of this paper are;

1. What is the status of teacher's pedagogical use of 21st century skills in line with Faculty/Institute?
2. What are the major facilities, barriers, and need for teachers to use 21st century skills?

The Conceptual Framework

Through the Internet, today's students have opportunities to engage in authentic tasks reaching beyond their classroom walls. Therefore, today's teacher must use pedagogical activities fostering students' communication and collaboration skills, integrating technology and problem-solving skills, and encouraging innovative and creative thinking, to produce 21st century learner (Saavedra & Opfer, 2012). In general, it is difficult to give a precise definition of 21st century skills and 21st century learner. Both concepts are basically derived from literature.

In recent literature, several frameworks (Larson & Miller, 2011; OECD, 2009; Saavedra & Opfer, 2012; Sahin, 2009; Schleicher, 2015) are found to define for 21st century skills . Among these frameworks, common skills are communication, collaboration; creativity, problem solving and learning to learn; ICT literacy; cultural skills, and citizenship. The assessment and teaching of 21st century skills consortium have organized such skills, knowledge, and attitudes into four categories: ways of thinking, ways of working, tools for working, and living in the world (Saavedra & Opfer, 2012). Their essence involves communication and collaboration skills; innovative and creative thinking skills and an ability to solve problems; expertise in technology; and being a global citizen. To determine how Nepalese HEI teachers are using 21st century skills into their pedagogical activities, this paper defines 21st century skills as: ways of working, ways of thinking, tools for working, and ways of living named as "WEL-L: Well -being for Living". The short explanations of these skills are as below.

1. W: ways of working: communication, collaboration. The example of such skills includes articulate thoughts and ideas effectively using oral, written, and nonverbal communication in a variety of forms and contexts; listen effectively to decipher meaning, including knowledge, values, attitudes; collaborate with others and demonstrate ability to work effectively and respectfully with diverse teams; assume shared responsibility for collaborative work, and value the individual contributions made by each team member.
2. E: ways of thinking (ways of expecting): reflective thinking, critical thinking, creativity, problem-solving, learning to learn, metacognition and innovation skills. Some examples include ability to consciously think about one's own studying and to combine different sources of information to create something new; ability to process large amounts of information to evaluate the reliability of information and to compare different sources of information; use a wide range of idea-creation techniques (such as brainstorming) to create new and worthwhile ideas, and evaluate own ideas in order to improve and maximize creative efforts; act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur.
3. L: tools for working. ICT literacy, professional digital competence (PDC). This kind of skill shows competency on a wide arrange of different devices, such as computers, tablets, smart phones, etc., as well as web-based applications and software, social media services (e.g., blogs) and online learning environments (e.g., Moodle, Office365) to perform professional works.
4. L: ways of living (having): Social and cross-cultural skills, Global citizenship, IK, and Gender, Productivity. This skill includes global awareness like, learn from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts; understand other nations and cultures; exercise the rights and obligations of citizenship at local, state, national, and global levels; understand the local and global implications of civic decisions.

Methods and Materials

There are several worldviews as philosophy of inquiry or research. Among them, a common paradigms in educational research are positivism, interpretivism, transformative theories and pragmatism (Creswell, 2014). In this paper, our intent is to enhance pedagogical activities to support 21st century skills. Therefore, the paper used pragmatic paradigm with a constructed reality. Creswell mentioned that this type of research activities is more problem based and involve appropriate strategies to overcome the existing problems (Creswell, 2014).

Within the pragmatic paradigm, this paper engaged a mixed method approach by utilizing both quantitative and qualitative data. In addition, a desk review of relevant policy/literature documents was also used.

A survey questionnaire focusing on 21st century skills was created. The questionnaire aimed to map the 21st century skills based on conceptual framework to further support on pedagogical activities. The questionnaire contained multiple-choice statements and three open-ended questions. The statements mapped the participants' digital pedagogical skills and practices as well as the application of 21st century skills in their teaching by applying a 5-point Likert-scale. The open-ended questions pertained barriers and needs in integrating digital pedagogy and 21st century skills. The validity of the questionnaire and semi-structured interview guideline was established by a pilot study. The pilot study was carried out among 67 faculties of Tribhuvan university. The Cronbach alpha coefficient of the questionnaire consisting of 24 items [6 item from each category] was found 0.61. After deleting 5 items, the Cronbach alpha coefficient of the questionnaire consisting of 19 items was found 0.83. Therefore, the final questionnaire with 19 items was used in the online survey. The quantitative data obtained through online survey questionnaire responses was analysed using both descriptive and inferential statistics using SPSS 18.

In addition to online questionnaire, semi-structured interview guideline was used to explorer the depth of the understandings of the HEI teachers. The qualitative data obtained through questionnaire and semi-structure interview was analysed through using Atlas.ti 8 through constant comparison method. Explicitly, the interview qualitative data were recorded in audio/video device and transcribed. The transcribed data were segmented with quotations. The quotations were coded. A word cloud was created for codes using Atlas.ti 8. With the help of the word cloud, themes were extracted. Finally, the codes were grouped as themes through constant comparison method.

The data collection process was inclusive, ensuring that as many HEI teachers as possible around the country Nepal could participate. The data were collected from faculties of Tribhuvan University Nepal sending online survey questionnaire to approx. 5000 faculties through official email provided by Tribhuvan University. These faculties were those who have received Tribhuvan universities official email by that time when the survey is administered. This was carried out with online survey questionnaire during November and January of 2021. Among them, 309 faculties responded on online survey. Later, online interview was conducted with 14 faculties who had already participated in the online survey questionnaire.

Above mentioned primary data were supplemented with secondary data and information from relevant documents and reports. Such documents and reports included but not limited to policies, guidelines, strategic plans, for examples School Sector Development Plan (SSDP: 2016-2023), ICT Master Plan (2013-2017), Three Year Plan (2011-1013), and IT Policy (2010) and other ICT initiatives of the of Governments of Nepal.

Profile of the Participants

The participants in this study were faculties of Tribhuvan University, Nepal. The total number of faculties to whom the online survey questionnaire sent was 5000. These faculties are teaching at 61 constituent campus of Tribhuvan university across the nation and 1 university campus at Kirtipur Kathmandu. These campuses are 12 in province 1, 5 in province 2, 25 in province 3, 7

in province 4, 7 in province 5, 2 in province 6, and 3 in province 7. In the email, it was clearly written, the responses will be voluntary and research ethics will be maintained. Among the 5000-email sent, only 309 faculties have submitted the online questionnaire. Therefore, these 309 faculties are considered as study participants.

Table 1: *Profile of Study Participants*

Profile		Frequency	Percent
Gender	Female	83	27%
	Male	220	72%
Age Group	25 – 35 years	70	23%
	36 – 45 years	111	36%
	46 – 55 years	94	31%
	56 and above years	31	10%
Current Position	Teacher	220	73%
	ICT personnel	5	2%
	Management	39	13%
	Other position	39	13%
Teaching experience	less than 1 year	15	5%
	5- 10 years	91	32%
	11- 15 years	53	19%
	more than 15 years	127	44%
Faculty / Institute	Faculty of Law	2	1%
	Humanities and Social Sciences	66	22%
	Faculty of Management	29	10%
	Faculty of Education	69	23%
	Institute of Medicine	37	12%
	Institute of Forestry	5	2%
	Agriculture and Animal Science	8	3%
	Institute of Science and Technology	64	21%
	Institute of Engineering	22	7%
Province	Province 1	35	11%
	Province 2	13	4%
	Province 3	177	58%
	Province 4	37	12%
	Province 5	36	12%
	Province 6	1	0%
	Province 7	8	3%

Among the 309 participants, 73% were teachers (teacher or teacher educator), 2% were ICT personnel, and 13% were the management persons (Dean, Director, Head, Campus Chief, and others). Among the participants, 13% were did not mention their position, and 6 data were in the missing level.

Among the 309 participants, 44% respondents have 15 years of teaching experience, 19% respondents have 11-15 years of teaching experience, 32% respondents have 5-10 years of teaching experience, and 5% respondents have less than 1 year of teaching experience. Among the participants, 23 data were in the missing level.

In the survey, sex variable was also included to address the inclusion principle. Among the 309 participants, 72% were male respondents and 27% were female respondents. In Tribhuvan University, the ratio of female teachers to the male teaches 19:81. Therefore, working faculties GPI in TU is 0.23. This evidence is well justified by the survey responses as 0.3 GPI was found.

Among the 309 participants, 23% respondents are within the rage of 25-35 years, 36% respondents are within the rage of 36-45 years, 31% respondents are within the rage of 46-55 years and 10% respondents are 65 years and above. This data shows that, 59% respondents have 18 years of service period as 63 years is the age limit in TU.

In the survey, the participants were selected from four faculty and five institutes of TU. These faculty/institute are the Apex body different academic programs in TU. Among the 309 participants, 7% were from institute of Engineering, 12% participants were from institute of science and technology, 3% 12% participants were from Institute of Agriculture and Animal Science, 2% participants were from Institute of Forestry, 12% of the participants were from Institute of Medicine, 23% participants were from Faculty of Education, 10% participants were from Faculty of Management,22% participants were from Faculty of Humanities and Social Sciences, and 1% participants were from Faculty of Law.

In the survey, the participants were selected from seven provinces of Nepal. Among the 309 participants, 11% were from Province 1, 4% were from Province 2, 58% were from Province 3, 12% were from Province 4, 12% were from Provinces 5, and 3% were from Province 7. In the survey 2 data were in the missing level.

These data are representative of the TU's faculties since the number of TU constituent campuses are 12 (20%) in province 1, 5 (8%) in province 2, 25 (41%) in province 3, 7 (11%) in province 4, 7 (11%) in province 5, 2 (5%) in province 6, and 3 in province 7.

Results and Discussions

Pedagogical use of 21st Century Skills as Ways of Working

In the survey, the participants were asked to rate their level of understanding to implement 21st century skills in pedagogical activities within five scales. The scale used were (1) never (2) few times a year (3) monthly (4) weekly (5) daily.

The table [See Table 2] shows that the participants teaching at TU at different levels reported in their survey responses that the use of 21st century skills as ways of working in pedagogical activities based on the definition as formulated in the study is found higher than the average level (M =3.20, SD = 0.98, N = 303), $t(302) = -14.02$, $p < 0.001$.

Table 2*: 21st Century Skills as Ways of Working*

Statements	1	2	3	4	5	Average
Gave feedback (online) to students.	4%	16%	20%	38%	22%	3.58
Used online platform to share work-related information with colleagues.	6%	26%	22%	33%	13%	3.21
Asked students to give peer feedback to each another online.	13%	26%	26%	27%	8%	2.93
Asked students to deliver an oral presentation to the teachers or others online.	6%	24%	30%	32%	7%	3.09
Supported students to communicate with each other online.	6%	17%	19%	32%	26%	3.53

The participants from four Faculty in TU reported that use of 21st century skills as ways of working in pedagogical activities is similar to the use of the participants from five Institutes. There was no significant difference in the scores on use of 21st century skills as ways of working in pedagogical activities from the participants from four Faculty (M=3.21, SD=1.05, N=164) and participants from five institutes (M=3.18, SD=0.89, N=138) conditions; t (300) =4.13, p = 0.82.

Pedagogical Use of 21st Century Skills as Ways of Thinking

In the survey, the participants were asked to rate their level of understanding to implement 21st century skills in pedagogical activities as ways of thinking within five scales. The scale used were (1) never (2) few times a year (3) monthly (4) weekly (5) daily.

The table [See Table 3] shows that the participants teaching at TU at different levels reported in their survey responses that the use of 21st century skills as ways of thinking in pedagogical activities based on the definition as formulated in the study is found higher than the average level (M =3.10, SD = 0.94, N = 296), $t(295) = 1.98$, $p = 0.04$.

The participants from four Faculty in TU reported that use of 21st century skills as ways of thinking in pedagogical activities is similar to the use of the participants from five Institutes. There was no significant difference in the scores on use of 21st century skills as ways of thinking in pedagogical activities from the participants from four Faculty (M=3.14, SD=0.98, N=159) and participants from five Institutes (M=3.06, SD=0.90, N=136) conditions; t (293) =0.77, p = 0.44.

Table 3*: Use of 21st Century Skills as Ways of Thinking*

Statements	1	2	3	4	5	Average
Asked questions to understand other colleagues' viewpoints (online).	6%	30%	26%	30%	8%	3.03
Asked students to solve real-life problems.	9%	30%	24%	25%	12%	3.02
Asked students to summarize and create their own interpretation of what they have read.	6%	22%	19%	39%	14%	3.32
Asked students to use brainstorming activities.	11%	22%	20%	30%	17%	3.20
Supported students' self-regulation skills (time management, setting own learning goals, recognize own needs and help seeking).	8%	26%	24%	25%	17%	3.16

Pedagogical Use of 21st Century Skills as Tools for Working

In the survey, the participants were asked to rate their level of understanding to implement 21st century skills in pedagogical activities within five scales. The scale used were (1) never (2) few times a year (3) monthly (4) weekly (5) daily.

Table 4*: Use Of 21st Century Skills as Tools for Working*

Statements	1	2	3	4	5	Average
Used learning management platforms (LMS) for teaching / working.	18%	19%	16%	27%	20%	3.12
Asked students to submit their assignments in LMS platforms.	21%	20%	18%	33%	7%	2.84
Created assignments using online platforms.	13%	23%	26%	30%	8%	2.99
Checked if the information used is up to date.	6%	18%	18%	27%	31%	3.59

The table [See Table 4] shows that the participants teaching at TU at different levels reported in their survey responses that the use of 21st century skills as tools for working in pedagogical activities based on the definition as formulated in the study is found higher than the average level (M =3.33, SD = 0.96, N = 296), $t(295) = 6.05$, p =0.001.

The participants from four Faculty in TU reported that use of 21st century skills as tools for working in pedagogical activities is similar to the use of the participants from five Institutes. There was no significant difference in the scores on use of 21st century skills as tools for working in pedagogical activities from the participants from four Faculty (M=3.25, SD=1.01, N=159) and participants from five Institutes (M=3.42, SD=0.87, N=136) conditions; t (293) =-1.5, p = 0.13.

Pedagogical Use of 21st Century Skills as Ways of Living

In the survey, the participants were asked to rate their level of understanding to implement 21st century skills in pedagogical activities within five scales. The scale used were (1) never (2) few times a year (3) monthly (4) weekly (5) daily.

Table 5*: Use of 21st Century Skills as Ways of Living*

Statements	1	2	3	4	5	Average
Supported students' identity and self-esteem building.	8%	25%	24%	24%	19%	3.21
Developed students' intercultural ability; willingness to understand different people.	14%	25%	20%	24%	16%	3.04
Integrated students' cultural and socio-economical background knowledge into teaching.	15%	31%	18%	20%	16%	2.90
Supported collaboration between home and school.	15%	24%	21%	23%	17%	3.01
Asked students to engage in local initiatives to improve the situation.	18%	28%	17%	26%	11%	2.84

The table [See Table 5] shows that the participants teaching at TU at different levels reported in their survey responses that the use of 21st century skills as ways of living in pedagogical activities based on the definition as formulated in the study is found lower than the average level (M =2.95, SD = 1.09, N = 296), $t(295) = -0.66$, p =0.50.

The participants from four Faculty in TU reported that use of 21st century skills as ways of living in pedagogical activities is similar to the use of the participants from five Institutes. There was no significant difference in the scores on use of 21st century skills as ways of living in pedagogical activities from the participants from four Faculty (M=2.99, SD=1.07, N=159) and participants from five Institutes (M=2.90, SD=1.12, N=136) conditions; t (293) =0.67, p = 0.51.

In the study, 14 interviews were taken with the participants who had already participated in the online survey questionnaire. The demography of the interview participants was from 7

provinces of Nepal, 2 from each province. Among the 14, interviews, 5 were Female and 9 were Male. Among the 14 interviews, 3 were from medicine, 2 were from engineering, 3 were from humanities and social science, 2 were from Education and 2 from ICT, and 2 from management. The analysis of qualitative data as mentioned in the method and material section above, are summarized with following headings.

Facilities to use 21st century skills

To identify the needed facility to utilize 21st century skills in curricular activities, the guiding question "What facilities, applications and resources would you need to develop students 21st century skills in pedagogy?" was asked. There were 79 quotations on internet and 96 quotations on training. Based on the data and word cloud as presented in *Figure 1: World Cloud for Need Facility to Use 21st Century Skills*, it is found that here is less practice to enhance student's 21st century skills through the implementation of pedagogical activities. This less practice of teacher's work is justified by a teacher's voice "*we invest our time and efforts to develop ICT skills for ourselves, but we have done less to develop such skills within our students*". Therefore, the statement examples that teachers need extra professional skill to implement 21st century skills in pedagogical activities.

In Nepalese HEIs, the communication and collaboration as way of working is still to improve as per the need of 21st century learners. The interview data showed that "*most of the female students in HEI do not have even mobile phones. It has even not allowed them to use mobile phones because parents often think that a girl with mobile leads to a bad ethical and social behaviours".* The consequence is, they are out of social and cognitive contact within and between peers and teaches in the need. However, it has also been said that "*teachers have improved communication skills as they are in regular contact with the student via MS-Teams and Facebook use as social medias*". It is seen that Facebook group for example, has been common digital tools among the students. Such social media has been used for notifications of assignments or to keep in touch with students or to disseminate curricular information.

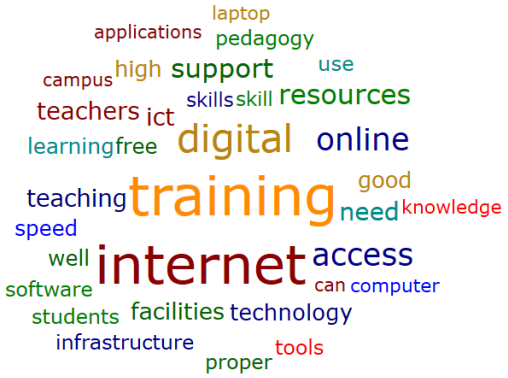

Figure 1: *World Cloud for Need Facility to Use 21st Century Skills*

Based on the qualitative data, it is also found that trainings and motivations, institutional support, internet support, access and support to Laptop/Computers and other digital accessories, ICT infrastructure, wi-fi zone are the urgent required facilities in Nepalese HEIs to implement teachers 21st century skills in pedagogical activities.

Barriers to Use 21st Century Skills

To identify the barriers to utilize 21st century skills in curricular activities, a guiding question "What barriers do you see in your daily work to apply 21st century skills in pedagogy?" was asked. The interview responses via audio/video were recorded. The recorded audio/video were transcribed. The transcribed data were segmented with quotations. The quotations were coded. Finally, the codes were grouped as themes. With the help of the cloud as presented in *Figure 2: World Cloud for Barriers to Use 21st Century Skills*, two major themes "internet", "lack of support" and student's diversity were extracted. There were 119 quotations on internet, 94 quotations on lack of support and 71 quotations on student's diversity. Based on the qualitative data, it was found that the social presence of the students is week in the classroom participation. In the interview, it is also said that "*student rarely ask question in the classroom, they just come to the college, listen lecturers, and often remain busy in common household works*".

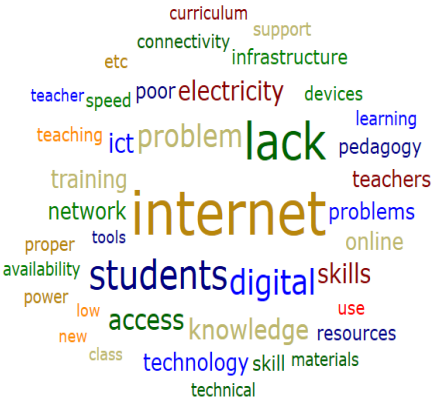

Figure 2: *World Cloud for Barriers to Use 21st Century Skills*

However, it is also responded that, in some places, student raise questions on unclear subject matter. There are some practices of group work too. It is said in the interview that "*students answer each other's questions, prepare in groups, exchange study materials*". In such cases teacher encourage students to discuss in groups. However, common, and successful method to engage students in learning is doing homework because teacher believe that, after giving homework, they ask each other, even with the teacher too.

Based on the data, the major barriers to utilize 21st century skills are the poor access to digital technology to students due to economic backgrounds; students coming from diverse backgrounds, especially from remote countryside without proper access to device, electricity and internet; non-availability of laptop for teachers; limited ICT infrastructure at working institution; low pedagogical participation cum irregular and low classroom attendence of students; and weak digital literacy and lackness of knowledge of internet to teacher and students.

Curricula to Use 21st Century Skills

To identify the need to utilize 21st century skills in curricular activities, a guiding question "What is needed for 21st century skills to be integrated as a qualified part of the curriculum?" was asked. There were 55 quotations on Curriculum and 60 quotations on training. Based on the qualitative data and word cloud as presented in *Figure 3: world cloud on curricula to use 21st century skills,* it is found that there is less practice to enhance student's creativity and innovation skills through the implementation of 21st century skills in pedagogical activities. This less practice

of teacher's work is justified by a teacher voice "*we have not made sufficient efforts to develop critical thinking skills within our students neither in past nor in present. Likewise, we have not used alternative approaches to develop creative and innovative skills within the students*".

Therefore, digital pedagogy should be integrated in curriculum for all subject, curriculum should be made friendly with technology, incorporation of online pedagogy as well.

Based on the data, it is found that "*regular training to faculties for a) updating their knowledge of ICT; b) sensitization on mission, vision and goals on syllabus and educational programme, c) using higher order thinking skills (HOTS) and lower order thinking skills (LOTS) in pedagogy and assessment"* can contribute to change in mindset of teachers to implements 21st century skills in pedagogical activities. Therefore, it is important for teacher to learn professional skills like digital tools; pedagogical use of assessment and evaluation; and skill related to selecting, designing, and applying quality learning materials.

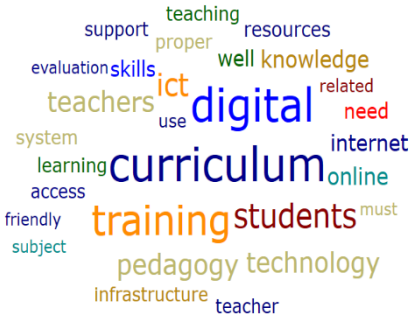

Figure 3: world cloud on curricula to use 21st century skills

Conclusion

From the analysis and reflecting the teachers' status of using 21st century skills in pedagogical approaches, it is found that there are no significant differences among TU teachers in terms of Faculty and Institute. Also, teachers are using moderate level of 21st century skills in pedagogical activities. It is seen that teacher's use of 21st century skills in pedagogical activities need an improvement and redefined pedagogical approaches. Based on qualitative data, major barriers found to use teachers 21st century skills in pedagogical activities are the necessary digital tools, institutional policy, and strategy for teachers and students. So, the needed facility to overcome the barriers and support teachers to use 21st century skills in pedagogical activities are continuous professional development and institutional support with necessary digital tools both in individual and institutional level.

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