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Curricular Goals and 21st-century Competency in Mathematics Education in Master's Degree Program

Sarala Luitel[2]

Abstract

The rapidly changing innovation in information and communication technology (ICT), digitalization and globalization has created unprecedented challenges and opportunities for education and educating practices globally. The higher education institutions now need to reform their curricula and the educating practices to promote employability skills to open door for every graduate to engage in the globally networked employment platform. With this background, this study focused on analyzing the professional courses of Mathematics Education at master level in reference to behavioral objectives and directed activities by curriculum. Among the professional courses, this qualitative document-based study is based on the purposively selected two courses; Math Ed 515 and Math Ed 535, as they largely represent the curricular goals of Mathematics Education. The data were analyzed based on theoretical understanding and conceptual framework. This study found, based on objectives and instructional activities, that the course Math Ed 515 focused on knowledge transmission rather than development of 21st century competencies. However, another course Math Ed 535 focused more on skill development along with knowledge transmission. These findings imply that courses in Mathematics Education program at the Master level at the selected university require reforms towards incorporating the 21st century competencies to enable the graduates to compete in the global marketplace.

Keywords: Mathematics Education, 21st century competency, knowledge society, global market

[2] Ms Luitel is a Lecturer at Central Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. Email: sarala@tucded.edu.np

Introduction

Preparing the youths for the increasingly competitive world is one of the challenges faced by educational institutions today. In that, the upgradation of the practices of current higher education (HE) system is urgent to meet the 21st century demands in terms of knowledge and skills the graduates need in the future. The understanding and skills needed to compete in today's global economy are quite different to those upon which 19th and 20th century education systems have traditionally focused (Suto & Eccles, 2014b). Many youths today, join HE to develop skills salable in the domestic as well as international market, while also aiming to make individual, social and economic transformation in their lives and the society they live in. So, billions of dollars of public money is invested in higher education institutions do prepare human resources with better education (Teague, 2015). While doing so, the challenges have emerged in equipping them with the knowledge and skills demanded by the 21st century job market. The institutions now need to reform their curricula and the educating practices to develop employability skills to open door for every graduate to engage in the globally networked employment platform. To fit to the global marketplace, graduates today need to make a good combination of personal potentials and principles, skilled performance, and the capability to effectively transform them in practice (Greenstein, 2012; Suto & Eccles, 2014b). More specifically, higher education institutions are generally expected to serve as human capital producers for the national and international development, for which the current curricula requires to be reformed.

Against this backdrop, this paper focuses on curricular reforms in mathematics education (ME) considering the 21st century skills required for the current youths. Integrating 21st century skills in the curriculum is necessary to prepare our youth for their future career (Alismail & McGuire, 2015). The curriculum and curricular policies should go along with the changes in the 21st century education system (Benju et al., 2020) that has increasingly faced rapid expansion of information and communication technologies

(ICTs), digitalization and globalization. There is a widespread impact of such situation of digitalization and globalization in the curriculum, pedagogy, and assessment (Gravemeijer et al., 2017) . Moreover, the integration of recent change and expectations in mathematics curriculum of teacher education program is a specific concern in this paper aimed to address.

Shifting Understanding of Mathematics and Mathematics Education. The role of mathematics in the society is changing, and so are the perceptions of people towards it. Generally, mathematics is taken as a social as well as a service-oriented subject realizing the global focus on mathematics attainment as a gateway to economic progress, applicability in various scientific and technological fields and its contribution to the development of individuals, stimulating thinking and communication skills (Gravemeijer et al., 2017). The mathematics education (ME) program needs to impart such skills needed for individuals to contribute to changing social spaces and services. For this, there is an apparent need to bring in reform in mathematics education, and this reform relates automatically to the evolving 21st century skills and their pedagogy. The changing scenario tells us that teaching mathematics is not about teaching math contents only but relating the mathematical knowledge and skills to the life and society in several forms (see, Sparrow et al., 2010). To relate the mathematics education with life and society, to enhance critical thinking and creativity of graduates, we need to consider the integration of 21st century competencies. Some studies (such as Benju et al., 2020; Gravemeijer et al., 2017; Suto & Eccles, 2014a) have highlighted that currently taught mathematics contents are not sufficiently helpful for solving practical workplace problems faced by individuals. This shows that there is a need to establish coherence between what is taught and what is used in the workplace and make the teacher education programs adherent to 21st century competencies and societal needs.

21st Century Skills and Competencies in Mathematics. The world is currently moving towards equipping our learners with skills that enable them to compete in the 21st

century job market (e.g., Boahin, 2018). Fully equipped learners only can compete in the competitive market in 21st century globalization context. This trend has created pressures in countries such as Nepal which are dealing with fundamental issues of quality and equity in educational systems. Although Nepal has achieved remarkable progress in higher education development, the attainment of the 21st century skills in full is still a long way to go. There is a rapid expansion of enrolment at higher education in Nepal, but the curricular reforms and innovations in education remain unachieved in timely manner. Though the enrolment rate is being higher, there are many issues like under-financing management, low managerial effectiveness, and quality erosion (Upadhyay, 2018) needing attention at the policy level. It is getting more important for jobseekers to be competent in knowledge constructions and problem solving, preferably by integrating ICT and creativity (Smit, 2016a). To address such issues, 21st century skills and competences are highly desirable for today's human resources (Vural & Vural, 2020).

A 21st century competence is a combination of knowledge, skill and attitude that is achieved in different modes of life beginning from the elementary education to adult working life (Smit, 2016a). According to Rychen (2003), most frequently skills consist of;

> the ability to learn how to learn (planning); the competence in reading, writing and computing (basic skills); be effective in listening and oral communication (communication); adaptability through creative thinking and problem solving; personal management; interpersonal skills; ability to work with other people (collaboration); basic technology skills (ICT literacy) and leadership (decision making). (p. 91)

Different institutions have prepared the key concepts for the necessary knowledge and for 21st century competencies. Table 1 presents some skills and competencies established by different institutions.

Table 1. *21st century skills defined by different institutions*

21st century categories	21st century skills		
	ATC 21S	Partnership for 21st century skills (2013)	OECD (1999)
Way of thinking	Creativity and innovation	Creativity and innovation	Creativity and innovative thinking
	Critical thinking	Critical thinking	Critical thinking
	Problem solving	Problem solving	Planning and organizing
	Decision making	Decision making	Decision Making
			Problem solving
	Learning to learn		Metacognition
	Metacognition		Learning to learn
Way of working	Communication	Communication	Communication
	Collaboration	Collaboration	Teamwork and Collaboration
			Ability to work without supervision and under pressure.
Tools for working	Information literacy	Information literacy	Basic digital skills
		Media literacy	
ICT literacy	ICT operation and concepts	ICT operation and concepts	Use basic hardware, software, and operate safely in online environment
Living in the worlds	Citizenship		
	Life and carrier	Initiative flexibility leadership	Self-discipline and self-management
			Leadership and negotiation
	Personal and social responsibility		

Sources: Aggarwal, 2021; Suto & Eccles, 2014

Different words and elaborations can be found in defining and characterizing 21st century competencies, but many more things are common across them. For example, creativity and innovations, critical thinking and problem solving, decision making, communication and collaborations, and ICT literacy (i.e., operation skills) are common focus of all the institutions. Directly or indirectly such skills are discussed as the 21st century skills and these skills develop competencies within a person.

Despite the fact that Nepal's higher education policy time and again reiterates quality concerns regarding the delivery of education, quality and relevance of programs that target quality enhancement have been questioned. Quality education synchronized with the diverse factors such as curriculum planning, classroom delivery, and assessment systems. Both curricular and instructional changes are expected as per the changes in the national and international market. The curriculum should be able to guide the learners' competencies (Kim, 2015) but my experience during my professional journey showed that the curriculum prepared for higher education in Nepal is content-focused rather than competency needed as per time. Growing awareness of the importance of higher education to the development of a knowledge-based economy requires us to rethink our current policies and practices in higher education (Cornalli, 2018). In this context, analyzing curricular goal and its alienation to the 21st century competency is important for revisiting the existing mathematics teacher education program. This research focused on this concern.

Research Questions

The learners' competencies are more valuable rather than a qualification in the newly generated labor market in the global scenario (Rotherham & Willingham, 2010). This idea is applied in teacher educators as well as teachers whose world of work is schools and higher education. Education should be responsible to fulfill the need of local and the global society focusing on the labor market that demands different levels of competencies. In this context, what types of competencies are expected from the curriculum of Mathematics Education at undergraduate and graduate level at a university in Nepal is one of the important research concerns. Therefore, this study has tried out to search the answer to the following research questions.

- How do the existing mathematics education curricula of master level of a university in Nepal align to the 21st century skills?
- In what extent the indicated pedagogy in curriculum has directed to practice 21st century skills in the classroom?

Theoretical and Conceptual Understanding

The 21st century era and the demands for education have changed due to the technological developments and educational institutions and associated professionals (teachers and students) are facing massive challenges of change. To address change in different types of skills in knowledge-based society or the digital society, it is felt that to development of 21st century skills is required for incorporating the changes to meet the societal demands (Herlo, 2017). In such contexts, the curricular goals and contents both need to be connected to the societal demands which are reflected in 21st century competencies. Connectivism paves the way to relate new skills needed in this 21st century to the curriculum. as new model of learning adequate to knowledge society where "knowledge is the set of connections in a network, and therefore, that learning is the ability to create and traverse those connections" (Downes, 2019, p. 114).

Connectivism is observed from three perspectives: knowledge, learning and community as a cycle (Herlo, 2017) where knowledge inform learning, what we learn informs community and community in turn creates knowledge. Principle of connectivism, as Siemens (2004) claims that currency (accurate and up-to-date knowledge) is intent of all connectivist learning activities and decision-making is itself a learning process. The main role of curriculum in the present-day world is to provide students with sufficient learning opportunities and context for humans to work for the service to the community. It needs to enable students to build their own learning environment that connect to the learning success network and lifelong learning through self-reflection (Herlo, 2017). This process supports students for transformation of knowledge, skills, attitude and emotional point of view through motivation and application (Downes, 2022). Finally, Kropf (2013) ensured after many literature review that connectivism, through various information reservoirs can explain how individuals in the 21st century learn (p. 22).

This theoretical understanding supports this study by relating the current provisions of curriculum in mathematics education to the 21st century competencies. For example, in

a problem-solving task, students' self-paced, self-motivated, self-reflective learning along with their creativity and innovation exist simultaneously, both in the curricular goals and the 21st century competencies. Meaning that, the ideas drawn on the theory of connectivism can be related to the development of students' creativity, critical thinking, problem solving and innovation as important learning goals which the mathematics curriculum emphasizes. Around this concern, the conceptual framework of this study has been developed.

The knowledge-based society in the 21st century not only requires content knowledge, but also competencies and skills including critical thinking, problem-solving, creativity, innovation, communication, collaboration, flexibility, adaptability, initiative, self-diversion, social, cross-culture, productivity and accountability, leadership and responsibility, and information literacy (Rizki & Priatna, 2019). Over the last fifteen years, several different frameworks and taxonomies have been proposed by a variety of organizations such as the European Parliament and the council of the European Union, the organization for economic cooperation and development (OECD) (Rotherham & Willingham, 2010; Tan, 2015). Among many, four consistently represented are: creativity, critical thinking/ problem solving, communication, and collaboration (Chu, et al., 2021; Coffland & Xie, 2015; Rotherham & Willingham, 2010; Smit, 2016a; Vural & Vural, 2020). According to Coffland and Xie (2015, p. 317), the 21st Century Mathematics curriculum will have the three characteristics: 1) connecting mathematics course content with real life, embodying and stressing the messiness of real life) 2) connecting between related topics within mathematics, enabling and encouraging learning progression, and 3) connecting math to other subjects in the curriculum, emphasizing an interdisciplinary approach. Though the mathematics education curriculum is based on the taxonomy of Bloom, Table 2 presents the changing understanding of skills regarding 20th and 21st century skills.

Table 2. *Changing scenario of skills*

20th century skills (close to Bloom's texonomy)	**21st century skills**
Recall of information (List, define, describe, name, locate, find, identify, label)	Mastry of core content (Embeding, retriving, recalling for mastry of content)
Making sense of content; describing and organizing it (Interpret, summarize, paraphrase, classify, give an example, estimate)	Communication and collaboration: expressing idea and working togather with others (Fitting into prior learnin, orgsnizing, communicating , constructing, and sharing)
Using the information (Carryout, use, modify, discover, demonstrate, show)	Appling past to new problem solving (Implimentating idea, using knowledge multiple, novel and personalized way)
Thoughtfully reconsidering the information (organize, outline, integrate, distinguish, breakdown, differentiate)	Metacognition: learning and self-aware thinking (Explore, relate, and connect, compare and distinguist)
Comparing, reasoning (Hypothesis, critique, devise, reorganize, appraise)	Critical thinking and productivity (Testing hypothesis, judging ideas)
Combining ideas in a comprehensible and unique way (compile, summarize, decision)	Leadership: responsibility and accountability Citizenship: contributing globally (combining idea for problem solving)
Production of original works, innovation (Recognize, innovate, invent, adopt an unusual approach, plan and produce, generate something new)	Creativity and innovation for applied purpose at work and in life. (Recognizing and Generating new idea for problem solving, Innovation for applied purpose in real life).

Source: Adopted from Greenstein, 2012; Suto & Eccles, 2014

Based on tables 1 & 2, I have prepared Figure 1 for the conceptual clarity for the 21st century skill rubrics summarized based on reading of other relevant literatures.

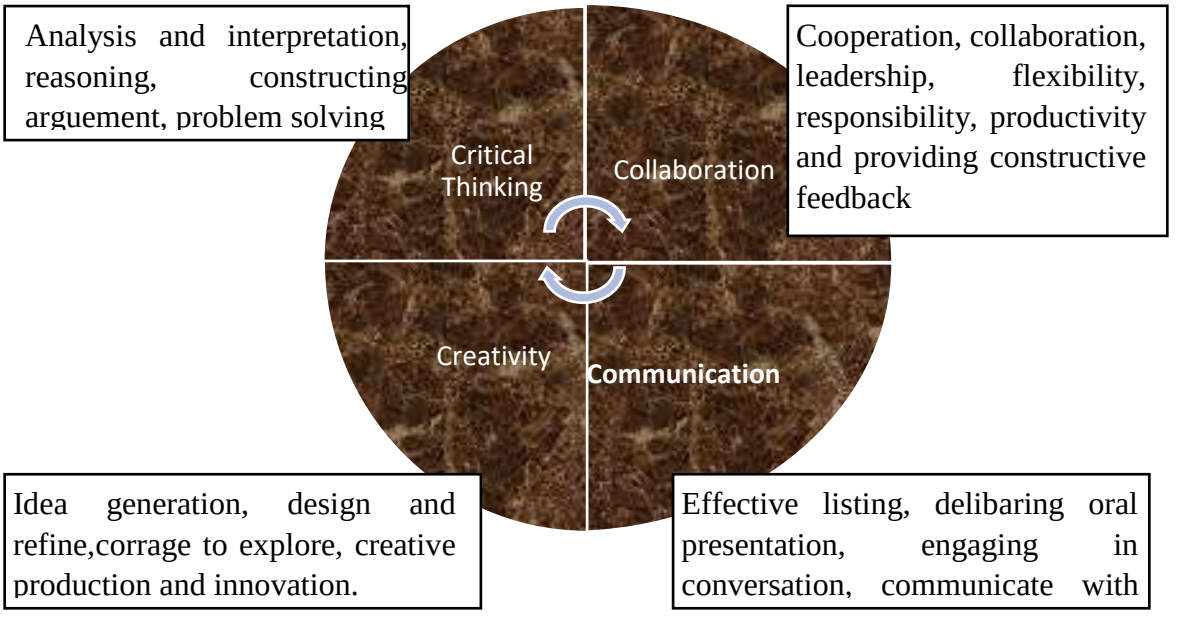

Figure 1: Conceptual framework

This conceptual framework as presented in Figure 1 has guided the analysis in this study to analyze the course objectives and directed instructional strategies set by the curriculum.

Research Methodology

This study is based on document analysis under the qualitative research methods. In qualitative research, document analysis requires data that can be examined and interpreted to elicit meaning, gain understanding, and develop empirical knowledge (Corbin & Strauss, 2008). Systematic evaluation can be used for document analysis that includes a variety of forms like background papers, books, diaries and journals, letters and memoranda, program proposals, maps and charts, and documents related to institutions and societies (Bowen, 2009). The document for this study includes curriculum of two courses i.e., Math Ed. 515 and Math Ed. 535 from Tribhuvan University. These two courses are professional courses from mathematics education. The curriculum objectives of the selected course were analyzed based on different categories of skills as 21st century skills and competencies based on conceptual framework. During the data analysis, I analyze data through the eyes of theory of connectivism.

Findings

Course structure and objectives. The objectives of the two professional courses of mathematics education: Math 515 and Math 535 were thoroughly analyzed. In these courses, I have examined unit wise objectives and pedagogy set by curriculum.

Foundation of Mathematics Education (Math Ed. 515). This course is prepared for the broader and the deeper understanding of the state of the art of mathematics education, updated to meet the changing needs of mathematics learning. It aimed at developing skills and ability of teaching resource collection, identify social and cultural issues of ME to connect with curriculum and classroom, report writing and presentation on different aspects of mathematics education. Table 3 summarizes its specific objectives and pedagogic strategies.

Table 3. *Course objectives and set strategies (Math Ed. 515)*

Units	Behavioral objectives	Assessment
I	Explain the meaning of mathematics from different point of view, major view of philosophy, causes of emergence of schools of thought and its failure, emergence of fallibilistic view. Identify major issues in philosophy, features of school of thought. Discuss mathematical branches/area/structure. List the characteristics of three schools of thought, the basic assumptions of social constructivism, assumption, and way of knowledge construction.	Expository teaching with some inquiry and guided questioning
II	Examine/Differentiate the difference between mathematics and mathematics education, ideology of Perri Theory in ME. Explain bases of ME in terms of major foundations, nature of aims and objectives	Debate/ Discuss on ideologies of ME
III	Explain the paradigm shift in learning theory of mathematics, constructivist meaning from different perspective and its premises. Discuss Ausubel's theory with illustration, Define and Illustrate Diane's concept and six progressive stages. Analyze the relationship between six stages and four principles for teaching concept. Develop a teaching/learning strategies for classroom application. Examine thought process of skimp	Expository technique, problem solving and discussion

	learning theory, Socio-culture construction, Summarize briefly about different learning theories and	
IV	Explain nature of instructional strategies, expository activities and use them to develop T/L activities for teaching skills, concept and a principle. Define problem solving, discovery learning list its steps/purpose and use in teaching. Discuss the importance and necessary of individualized instruction in mathematics teaching. Examine teachers' role and students' role and use them in developing teaching activities for diverse learners in constructivist classroom.	Expository model, problem solving model, discovery model, constructivist, socio-cultural and socially critical theories-based techniques and method of teaching respective model
V	Identify different types of materials to equip math class and explain how to manage them. Discuss the use of software packages for math teaching. Differentiate and discuss use of manipulatives and virtual manipulative in math teaching, ways of using computer in T/L , importance of multimedia packages. Explain the educational objectives of games and paradoxes and develop/select games for teaching different mathematical objects.	Less expository presentation and more focused on study task and then discussion and question answer sessions.
VI	Examine historical development with respect to social development and discuss cultural foundation of ME and its role. Explain cognitive model of difference and implication in teaching, how social & cultural model seek to understand students' learning problems in diverse background? Analyze role of social diversity in framing curriculum and teaching practice.	Debate on equality and equity in mathematic classes
VII	Explain the meaning and importance of teacher education, the model of staff development. State and explain components of staff development. List principles and discuss its significance of professional Identify development for mathematics teachers. different area needed for teacher education and examine their interrelationship.	Discussion class on different models of staff development

From Table 3, organization of this course objectives are found more nearer to knowledge construction rather than professional skills development. In objectives, I found terms like explain, list, discuss more frequently. Skill oriented terms like construct, create, connection, development, prepare, communicate are found very rarely, almost none in use.

Similarly, I tried to search such focus in the indicated teaching pedagogy, I found very less focus on developing model, construction, connection and reflection for new creation. From the pedagogical perspective, group work, oral presentation, discussion and reflection, design, refine, constructing, creating, argument problem solving based on context found very less in pedagogic indication.

Teaching Undergraduate Mathematics (Math Ed. 535). This course is designed to sharpen students in content as well as pedagogical knowledge for teaching secondary and undergraduate level. This course aims to provide meaningful content knowledge and pedagogical knowledge to enhance skills for foundation subjects. Table 4 illustrates the details of this course.

Table 4: *Course objectives and set pedagogy (Math Ed. 535)*

Units	Behavioral objectives	Pedagogy for set objectives
I	Explain the philosophy of undergraduate mathematics, APOS theory of learning Differentiate learning behaviors of adult and children. Analyze the instructional strategies for undergraduate students in mathematics teaching	Support for Group project, help to prepare term paper for writing mathematical proofs, different methods of writing proofs and language of mathematics for writing for writing essay
II	Expose the system of mathematical reasoning as mathematician do for generating mathematics. Explain the way of writing proofs of the theorem and solving mathematical problems. Analyze the language of logic in mathematics, Teach language of logic (qualifier, quantifier, and connecting ideas). Use different models of theorem proving for facilitating students in reading mathematics.	Support for Group project, help to prepare term paper for writing mathematical proofs, different methods of writing proofs and language of mathematics for writing an essay individually or in group.
III	Sketch the development history of algebra and analysis for teaching purpose. Examine the problems of learning abstract mathematics like analysis, algebra, group theory linear algebra etc.	Writing essay and sharing with peers/ friends using ICT to improvement, Group work to prepare PBL lesson

IV	Review by contrasting strategies to use problem-based learning (PBL) at secondary and undergraduate level. Get experience on designing lessons based on PBL and use it in classroom as action research project to make reflection. Reflect research studies in instructional practices at collage level. Critically examine the relevance of different instructional strategies along with ICT at undergraduate level.	Forming multiple groups and share as seminar, sharing assignments with community of learners, open book test.
V	Use idea to reduce abstraction in mathematics at both school and undergraduate level. Utilize the fundamentals and basis to develop theorems and for solving problems of students for teaching analysis, topology etc. Reconstruct the fundamentals of mathematics through extensive journey over the content usually taught at secondary and undergraduate level. Examine and analyze and present missing link in teaching mathematics courses in the designed level preparing some typical lessons for analysis, topology etc.	Reading and reflecting, writing papers for problem solving, sharing assignment to community of learners through F2F and online mode, open book test, Preparation of teaching, learning and training modules in group and share in peer teaching.
VI	Reduce abstraction in course of teaching geometry at secondary schools and undergraduate level. Re-construct and utilize the fundamentals of geometry and basics of different system of geometry for developing a theorem and solving a problem in teaching for usually taught geometry content and guiding the student's solving problem. Examine, analyze and present missing link in teaching geometry in designed level preparing some typical lessons for different method of proof.	Reading and reflecting, writing papers for problem solving, sharing assignment to community of learners through F2F and online mode, open book test, Preparation of teaching, learning and training modules in group and share in peer teaching.

Table 4 shows that this course has tried to improve more skill-based activities rather knowledge transmission. The objectives in this course focused on enhancement of skillful ability such as creating new models for learning using multiple idea, reconstruction, presentation, utilization, etc. Pedagogy also has been set in the same way, such as

preparation seminar paper in group and sharing within peers, preparing essay, different models for training and sharing using dual mode as face-to-face and online/virtual mode, etc.

Discussion

Mathematics is taken as a service subject for every subject and is fundamental to science and technology (Churchhouse, 1988). Technological knowledge is being fundamental for 21st-century human resources. In this situation, the curricular goals of the academic degree should be able to fulfill the societal needs to make a person a lifelong learner (See Marope, 2017) as well as get access to the global level human resource market. Such objectives can be attained if the courses focus on competencies, not only knowledge. A study conducted by Kytmanov et al. (2016) indicated that competency-based learning is better than knowledge-based learning that consists of professional orientation, interdisciplinary links, informatization, and fundamentalization which is not demanded and obtained in knowledge-based learning. Connectivism also prefer the same theme as learning happens through connection and reflection, which is also the focus of 21st century competencies.

In mathematics education, the ability to communicate is one of the skills students should possess to read mathematical language and communicate its meaning (Ruswanto et al., 2018). From Table 3, the communication skills for students can be increased through engaging them in 'reading and reflection', 'critical appraisal', and oral presentation sharing ideas within group. Though the words 'reflection' and 'critical appraisal' preserve higher value than just communication, it passes through the communication skills. Similarly, collaboration skills within learners improve assigning group discussion, presentation and group assignment where students can share and collaborate for new idea to upgrade themselves and produce new objective solutions. The activities prescribed in the curriculum expect students establish networks for learning. Such networks help them to connect with their peers, other professional groups and platforms according to connectivism. Connectivist theory states learning is best developed through personal

networks that the learner can acquire viewpoints and diversity of opinion to learn to make critical decisions and make collaboration (Duke et al., 2013). Learners can learn skill of collaboration while preparing assignments in group, which develops their skills of connecting and communicating with appropriate skills.

Another equally important skill that mathematics courses can promote is creativity. It is one of the most essential competencies for the learners to understand the process of creating new ideas by elaboration, refinement, analysis and evaluation of the pre-existing concepts and innovating new ones. Creative skills should include 5 major areas: imagination, being self-disciplined, resiliency, collaboration and giving responsibility (Smit, 2016b). He further elaborates that creative skills aren't just about good ideas; they are about having the skills to make good ideas happen. The review of the curriculum in this study revealed that skills such as self-study, browsing-reading-reporting and resolution, review writing, essay writing, reflective writing, and engagement in critical discourse on mathematics and its application related issues are the places where the students can exercise their creativity. Along with creativity, critical thinking skills were expected to foster students' judgement and decision-making skills to solve different kinds of (non-) familiar problems with effective reasoning (Soland et al., 2013). With this explanation, our curriculum has also created space to exercise critical thinking with the focus on implementation of theory in the classroom, prepare problem-based learning model lessons to solve mathematical problems, finding a gap in teaching mathematics and presenting the mathematics into the form of reducing abstraction to fit the gap. Students need to interpret information, make solid connections between different types of information and draw a conclusion out of the information by critical thinking skill (Soland et al., 2013). Comparing two courses, i.e., Math Ed. 515 and Math Ed. 535, I found the former was knowledge-based course compared to the latter which is more skill-based. Skill based course can enhance 21st century skills and competencies rather Knowledge-based arranged course.

Conclusion and implications

The curriculum analysis of mathematics education for the two selected subjects reflected that curriculum has emphasized the communication, collaboration, creativity and critical thinking skills on the part of the students. However, Math Ed. 515 was more knowledge based than Math Ed. 535 which was skill based. To enable students to deal with global demands, more skill-based course is needed, as 21st century competencies require skills that solve practical problems creatively. Similarly, while the world education is moving towards skills and competencies to deal with practical problems, it is imperative that the curriculum of Mathematics Education at Tribhuvan University should change to meet those goals and aspirations. For this, the curriculum should consider globalization, digitalization and incorporation of information and communication technologies so that the learners meet the global market demands. Hence, the curriculum needs to be revisited timely focusing the skills and specific competency in the curriculum. Although the review of the curriculum showed peripheral incorporation of 21st century skills and competencies, a lot has yet to be done to fully address those competencies in mathematics education at the Master level in Nepal.

This implies that educators and curriculum development experts need to develop awareness about the growing trend of skill-based courses to meet the market demands and tune the current courses towards this direction. Hence, the findings of this study are useful for policy level changes as well as practice level changes, both of which are useful for changing the current curricular and pedagogical practices at master level programs, especially of Mathematics Education.

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