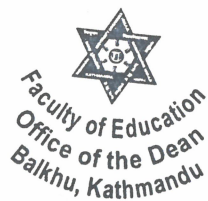


Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior



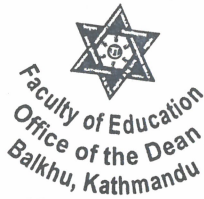
Karna Bahadur Chongbang

A Dissertation for the Degree of Doctor of Philosophy in Education

Submitted to
Graduate School of Education
Office of the Dean
Faculty of Education
Tribhuvan University
Kathmandu, Nepal

November, 2024

Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior



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Roll No.: 04 (2075/76 BS)

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A Dissertation for the Degree of Doctor of Philosophy in Education

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This study, Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior, is rooted in the critique of the teacher-centric pedagogical practice which is historically embedded and is constantly emphasized in pedagogical policy, plan, and discourse in the context of Nepal. The objectives of this study were to measure the dynamism of instructional behavior and to explore its dynamics that intersect with complex systems' entities which are mostly ignored in the linear causal systemic research tradition.

The research was based on explanatory sequential mixed methods design focusing on pragmatic procedure and knowledge construction for solving the practical problem in instructional behavior. In the quantitative phase, 54 lessons of 13 science teachers and 64 lessons of 14 social studies teachers from the randomly sampled 14 schools had been systematically video recorded and encoded the activities in every five-second interval using ACI. In the subsequent qualitative phase, narrative interview was conducted to explore holistic and comprehensive information from purposively sampled four distinct participants with the highest time occupation in student speaking, lecturing, and notebook work, and the lowest time occupation in teacher lecturing.

The descriptive statistics, based on the 24,800 and 22,278 units of five-second interval observation in social studies and science subjects respectively, shows lecturing 68.60% time occupation in science and 75.42% in social studies. On the other hand, the result shows zero activity of open laboratory work in science and library and field-trip works reporting in both subjects. As found in the result, it shows the ratio of the classroom time occupation of student activity to teacher activity in science is .13 and, in social studies, it is .11. In 1974, in the Pfau's study, it was .09 and .08 in the respective subjects. One-sample t-test result on teacher questioning (in both subjects) is significant negative. On the other hand, notebook work in science is

significant positive. Likewise, there is no significant difference in the test result of teacher lecturing (in both subjects) and students speaking in science.

The integrated impacts of the favorable and unfavorable roles of the influencing dynamics make the instructional behavior appear with null, constant, reversing, transforming, and non-oriented characteristics which reveal evolving dynamism. The assessment criteria, student interest, time comfort, and teachers' pedagogical knowledge and skill are found powerful influential dynamics to the classroom behavior. Stating particularly, classroom notebook work, which is a teacher-centered activity, has significantly increased in comparison to the past, despite of the policy intent and discourse on the notebook work. This notebook work behavior has been encouraged by the parents' and stakeholders' expectations of good marks. On the other hand, the significant decline in teacher questioning and a slight decline in student speaking behaviors indicate that the classroom verbal interaction has decreased to some extent. Unlike policy and discourse intents, and paradoxes in them, the wide coverage of contents, time limitation, theoretical knowledge-focused assessment, content expertise tradition, and economic condition are the resistant dynamics to transform the lecturing behavior.

The study presents a new theoretical dimension to understanding the school classroom behavior, as a complex adaptive instructional behavior, a complex systemic entity, that is systems-embedded, slow evolving, adaptive, knowledge-based, complex, value-oriented, and directly interwoven into microsystems of a school and its classroom. The classroom behavior evolves through the interaction of the supporting and distracting dynamics of the systems. The immediate and micro systems dynamics of the classroom behavior are more powerful than the macro systems dynamics which implies a micro instructional policy development that can evolve within a school system.

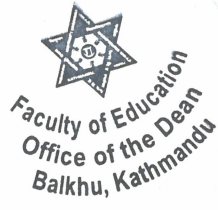
कक्षाकोठा गतिशीलता तथा गतिकीहरू शिक्षक र विद्यार्थी व्यवहारको अध्ययन शीर्षकको यो विद्यावारिधीय अनुसन्धान नेपालको शैक्षणिक पद्धतिको नीति, योजना र बहसमा निरन्तर समावेश हुँदै आएको शिक्षक केन्द्रित अभ्यासको आलोचनात्मक पृष्ठभूमिमा आधारित छ। यसका उद्देश्यहरूमा जटिल प्रणालीहरूको अधीनस्थ एकाइहरूको अन्तर्क्रियात्मक परिवेशमा हुने शैक्षणिक क्रियाकलापको गतिशीलता मापन गर्नु र यसका गतिकीहरू र तिनको भूमिका पत्तालगाउनु रहेका छन्। रेखीय कारण-प्रभाव प्रणालीगत अनुसन्धान परम्पराका मान्यताले यस्तो जटिल गतिकीहरूको भूमिकालाई बेवास्ता गरेको पाइन्छ। व्याख्यात्मक आनुक्रमिक मिश्रित विधिका ढाँचामा आधारित यो अध्ययन शैक्षणिक क्रियाकलापको व्यावहारिक समस्या समाधान गर्न सक्ने प्रयोजनमुखी प्रक्रिया र शैक्षणिक व्यवहार सम्बन्धी ज्ञान निर्माणमा केन्द्रित छ। कक्षा नौ आधारित यो अध्ययनको परिमाणात्मक चरणमा सांयोगिक प्रक्रिया अपनाई नमुना छनोट गरिएका १४ वटा विद्यालयको १३ जना विज्ञान शिक्षकहरूको ५४ पाठशिक्षण तथा १४ जना सामाजिक अध्ययन शिक्षकहरूको ६४ पाठशिक्षणको व्यवस्थित भिडियो रेकर्ड गरी ACI को नियम अनुसार प्रत्येक पाँच सेकेन्ड अन्तरालमा क्रियाकलापहरूको कोडिङ गरिएको थियो। गुणात्मक चरणमा विद्यार्थी कुराकानी, शिक्षकको व्याख्यान तथा अभ्यास पुस्तिका (नोटबुक) प्रयोग गर्ने कार्यमा सबैभन्दा बढी शिक्षण समय लगाएका र व्याख्यानमा सबैभन्दा कम समय लगाएका आधारमा चार जना सहभागी शिक्षकलाई उद्देश्यमूलक विधिबाट नमुनाको रूपमा छनोट गरिएको थियो। उनीहरूसँग समग्र तथा विस्तृत तथ्यसङ्कलन गर्न अनुभवमूलक घटना वृत्तान्त अन्तर्वार्ता लिइएको थियो।

कक्षामा रेकर्ड गरिएका भिडियोहरूलाई अवलोकन गरी सामाजिक अध्ययन विषयमा २४,८०० तथा विज्ञान विषयमा २२,२७८ पटक पाँच सेकेन्ड अन्तराल एकाइमा कोडिङ गरिएको थियो। उक्त कार्यमा वर्णनात्मक तथ्याङ्क शास्त्रीय विश्लेषणको नतिजा अनुसार शिक्षकको शिक्षण व्यवहार अभ्यास समयावधि विज्ञानमा ६७.६०% तथा सामाजिक अध्ययनमा ७५.४२% रहेको थियो। यस नतिजाबाट विज्ञान विषयमा खुला प्रयोगशाला कार्य र विज्ञान तथा सामाजिक अध्ययन विषयमा पुस्तकालय र फिल्ड-ट्रिप रिपोर्टिङ कार्य कक्षाव्यवहारमा शून्य रहेको पाइएको थियो। वर्तमान समय (सन् २०२२) मा गरिएको अध्ययन नतिजाले कक्षाकोठामा विद्यार्थीकेन्द्रित गतिविधि र शिक्षककेन्द्रित गतिविधिको अनुपात विज्ञानमा ०.१३ तथा सामाजिक अध्ययनमा ०.११ भएको देखाएको छ। उक्त अनुपात सन् १९७४ मा Pfau द्वारा गरिएको अध्ययनले विज्ञानमा .०९ तथा सामाजिक अध्ययनमा .०८ रहेको देखाएको थियो। एकल-नमुना t-परीक्षण गर्दा शिक्षकले प्रश्न गर्ने विगत र वर्तमान शैक्षणिक व्यवहारको अभ्यासको अन्तर दुवै विषयमा महत्वपूर्ण देखिनुको साथै उक्त अन्तर ऋणात्मक रहेको छ। उक्त परीक्षण नतिजाले विज्ञान विषयको कक्षामा अभ्यास पुस्तिका (नोटबुक) को प्रयोग गर्ने व्यवहार अन्तर महत्वपूर्ण भएको र उक्त अन्तर धनात्मक तर्फ देखिएको छ। त्यसैगरी शिक्षकको

व्याख्यान व्यवहार दुवै विषयहरूमा विद्यार्थीको बोल्ने (अभिव्यक्त गर्ने) व्यवहार विज्ञान विषयमा गरिएको t-परीक्षणको नतिजामा खासै भिन्नता छैन ।

अनुकूल र प्रतिकूल भूमिका खेल्ने गतिकीहरूका एकीकृत प्रभावले शैक्षणिक व्यवहारलाई शून्य, स्थिर, उलट, रूपान्तरण र गैर-उन्मुख विशेषताहरू भएको उद्विकासिन् गतिशीलता निर्माण गरेको छ । कक्षाशिक्षण व्यवहारको रूपान्तरण उन्मुख गतिशीलताका निम्ति मूल्याङ्कन मापदण्ड, विद्यार्थी चासो, समय उपलब्धता र शिक्षकको शैक्षणिक ज्ञानगत र सिपजन्य गतिकीहरू प्रभावशाली भएको पाइन्छ । कक्षाकोठा शिक्षणमा अभ्यास पुस्तिका सम्बन्धी कार्यलाई शिक्षककेन्द्रित क्रियाकलापको रूपमा लिइन्छ । नीतिगत अभिप्राय र रूपान्तरण बहसका बावजुद पनि अभ्यास पुस्तिका कार्य विगतको तुलनामा अनपेक्षित रूपले वृद्धि भएको छ । मूल्याङ्कन मापदण्ड तथा परीक्षामा विद्यार्थीले राम्रो अङ्क प्राप्त गर्नुपर्ने अभिभावक र सरोकारवालाको अपेक्षाले उक्त अभ्यास पुस्तिका कार्यसम्बन्धी शिक्षकको व्यवहारलाई प्रोत्साहन गरेको छ । कक्षाशिक्षणका क्रममा शिक्षकले प्रश्न गर्ने शैक्षणिक व्यवहारमा आएको उल्लेख्य ह्रास र विद्यार्थीको बोल्ने क्रियाकलापमा देखिएको सङ्कुचन अवस्थाले कक्षाकोठाको मौखिक अन्तर्क्रिया विगतका तुलनामा घटेको देखिएको छ । नीति तथा बहसका उद्देश्य विपरीत तिनीहरूमा रहेका विरोधाभास, विषयवस्तुको व्यापकता, शिक्षण समयको सीमितता, सैद्धान्तिक ज्ञानकेन्द्रित मूल्याङ्कन, विषयगत ज्ञानमुखी विशेषज्ञता, परम्परा र विद्यालयको आर्थिक अवस्थालाई शिक्षकको व्याख्यान व्यवहार परिवर्तनको प्रतिरोधी गतिकीहरू भएको पाइएको छ ।

यस अध्ययनमा विद्यालयको कक्षाकोठाको व्यवहारलाई प्रणालीगत एकाइका रूपमा कार्य गर्ने जटिल अनुकूलनीय शैक्षणिक व्यवहारका रूपमा बुझ्ने नयाँ सैद्धान्तिक आयामका रूपमा प्रस्तुत गरिएको छ । कक्षाकोठाको व्यवहारको स्वरूप प्रणाली-सन्निहित, सुषुप्त परिवर्तन, अनुकूलन ज्ञानमा आधारित, जटिल र मूल्य-उन्मुख हुने भएकाले यसको सम्बन्ध सूक्ष्म पद्धतिका रूपमा क्रियाशील विद्यालय र यसको कक्षाकोठासँग प्रत्यक्ष गाँसिएको हुन्छ । कक्षाकोठाका शैक्षणिक व्यवहारले प्रणालीहरूको समर्थन र विचलन गतिकीहरूसँग अन्तर्क्रिया गर्दै उद्विकासिन् गतिशीलताको स्वरूप ग्रहण गर्दछ । कक्षाकोठा व्यवहारलाई दूर/बृहत् प्रणालीहरूको गतिकीहरूले भन्दा निकट तथा सूक्ष्म प्रणालीहरूको गतिकीहरूले बढी सघन रूपले प्रभाव पार्दछ । यसले विद्यालय पद्धतिमा आधारित सूक्ष्म शैक्षणिक नीति निर्माण हुँदा बढी प्रभावकारी हुन सक्ने सङ्केत गर्दछ ।

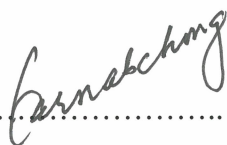


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2024

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I hereby declare that this dissertation, titled Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior, is the result of my original ideas, research, and writing. All literature and information utilized in this study have been properly acknowledged in the text and references, in accordance with the American Psychological Association (APA) 7th edition publication manual adopted by the Graduate School of Education at Tribhuvan University. Furthermore, no part of this dissertation has been published or submitted for any academic award prior to this.

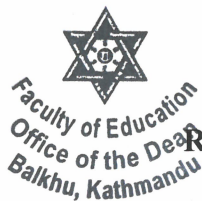


.....
Karna Bahadur Chongbang

Scholar, Doctor of Philosophy in Education

November 10, 2024 AD

2081-07-25 BS



Recommendation Letter

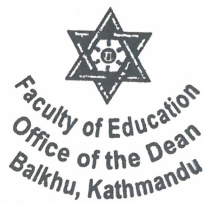
Mr. Karna Bahadur Chongbang, a scholar with a Doctor of Philosophy in Education, has developed his dissertation titled Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior under our supervision. He has meticulously completed his scholarly works in accordance with the requirements set by the Graduate School of Education, Faculty of Education, Tribhuvan University, for the dissertation. Therefore, we recommend the dissertation for further evaluation and acceptance.

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Approval Letter

This dissertation, entitled Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior, presented by PhD scholar, Mr. Karna Bahadur Chongbang, to the Faculty of Education, Tribhuvan University, for the degree of Doctor of Philosophy in Education has been examined and approved.

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I feel grateful to the Coordination Division of the Office of the Rector at Tribhuvan University for granting me study leave. I am also thankful to Assoc. Prof. Krishna Prasad Dhakal, Campus Chief; and Prof. Badri Prasad Bidari, the Head of the Education Department, Mahendra Ratna Campus, Tahachal, for their official



recommendation. Without the leave, my extensive field research for the dissertation would not have been accomplished to this extent.

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Abbreviations

ACI	Activity Category Instrument
ADB	Asian Development Bank
ARNEC	All-round National Education Committee
CDC	Curriculum Development Center
CDST	Complex Dynamic Systems Theory
CERID	Research Centre or Educational Innovation and Development
CPD	Continuous Professional Development
df	Degree of Freedom
EDCU	Education Development and Coordination Unit
EFA	Education for All
FIAC	Flanders Interaction Analysis Categories
ICT	Information and Communication Technology
M	Mean
Max	Maximum
Min	Minimum
MKO	More knowledgeable other
MOE	Ministry of Education
MOEST	Ministry of Education, Science and Technology
N	Number of subjects
NCED	National Center for Educational Development
NCF	National Curriculum Framework
NEC	National Education Commission
NESP	National Education System Plan
NNEPC	Nepal National Education Planning Commission

PCK	Pedagogical Content Knowledge
PEP	Primary Education Project
RQ	Research Question
SD	Standard Deviation
SESP	School Education Sector Plan
Sig.	Significant
SSDP	School Sector Development Plan
SSRP	School Sector Reform Program
Stat	Statistics
TG	Teacher's Guide
TPD	Teacher Professional Development
ZPD	Zone of Proximal Development

Chapter One

Introduction of the Study

This chapter introduces the study structuring the background and context information that depicts the study's orientation. Furthermore, the chapter states the problem embedded in the instructional behavior study; and presents its rationale and significance. The research objectives and questions contained in this chapter specify the intended output of this research. The delimitations of the study of this chapter concretize and shape the study from various aspects. Finally, the operational definitions of key terms given in this section draw operational meaning. This chapter, hence, reflects my "voice" (Clare, 2004, p. 20) established in this dissertation.

Background of the Study

The advent of formal education along with its school system and classroom practice in Nepal has crossed a half-century. The emergence of formal education shifted from the indigenous to the modern educational practice. The pedagogic action in the early development of the formal education system is characterized by the concept of Bourdieu's, cultural arbitrary, and arbitrary power signifying symbolic violence and imposition (Bourdieu & Passeron, 1990) (Bourdieu & Passeron, 1990). It is zero pedagogy for Sternberg (2007) and Guthrie (2015); and the English education system of the British model in Nepal for Singh (2015), in the heyday of the pro-British Rana elitism prevailed for one century. After that period, tremendous efforts and initiatives have been made in education where teacher education and training are always at the heart, whether in the concept and policy of public school system or community school system, to bring changes in the classroom pedagogical context that is to be acted on teacher and student's behavior. Hence, the behavior is an

intertwined endeavor with classroom dynamism that is netted with complex dynamics including the personhood of teacher and student.

Personhood might be understood as a sociopolitical capacity for rights and responsibilities attendant on being an agent, subject, or self (Kockelman, 2013). In a concise understanding, the schooling system and its classroom are in a complex context of diverse "ideological powers" of stakeholders, formal and bureaucratic "political power" of the state, and feeble "economic power" (Mann, 2012, pp. 22-28) which implies almost symbolic meaning to understand but persists unavoidably. The four reasons that cause complexity in the school system are diversity of people, complexity in each, complex learning, and complex schooling contexts (Cunningham, 2014). The influence of this complexity on the classroom activities of teachers and students is unlikely to be ignored.

In any country, the central reason for the existence of the school system is to provide academic learning to students (Elmore, 1990), which is rooted in a particular socio-political timeframe of the country. It is a live institutional system with day-to-day practices of schooling that are deemed to be both socially constructed and historically located (Hamilton, 1989). Historically, Nepal has briefer experience in the formal school education system in comparison of the developed countries. When we turn back to history, we find that formal schooling began during Junga Bahadur Rana's premiership with the establishment of Durbar School in 1854 (Caddell, 2007). The then education policy had been strongly influenced both by external models of schooling and education reform and the ruling elite's wishes (Caddell, 2005, 2007) which characterized the British system of education (Bista, 1991). By birth, formal school education seems to be an instrumental mechanism to produce government employees for the regime and practice the knowledge, culture, power, and value of the

regime of the sociopolitical elite. There was "no real educational policy" (Bista, 1991, p. 121) for the schools and educational institutions to function to carry out activities by personnel and institutions. After the downfall of the Rana regime, a comprehensive education policy for mass education evolved under the then-democratic government. The school system of public education, in the new political context after the end of the Rana regime, stated in the report of the Nepal National Education Planning Commission as national schools (Nepal National Education Planning Commission [NNEPC], 1956) signifies the state politics intervening with political power. Being a public schooling policy, national education has ensured features like universal, national, free, needs-based, citizenship-building, mass-based, available to all, professional teacher, and people-valued education. Observing the shift in the political system and change in the education policy of Nepal; (Caddell, 2007) notes:

Each shift in the political regime has been followed by the revision of the education system as the incoming regime attempted to reinforce its vision of the idea of the Nepali nation-state by re-articulating the relationship between the state, schools, and 'the people'. (p. 6)

In this sense, school plays an instrumental role in enacting the educational policy and vision of the state under the Ministry of Education, currently recognized as the Ministry of Education, Science, and Technology, to meet the envisioned and defined needs and aspirations of the people of a particular country. In the changing socio-political contexts of Nepal, the policy direction suggested by the All-round National Education Committee and the National Education System Plan (NESP) under the *Panchayat* regime explicitly hinted that the school system orients one to be disciplined, humble, and loyal to the God, the State, and the King, ideal citizen, and laborious person (Ministry of Education [MOE], 1971). In my view, the policy, based

on the ARNEC (All Round National Education Committee [ARNEC], 1961) report, philosophically orients idealism whereas the latter, the NESP, orients idealistic experimentalism. The former stressed uniformization of the school system including the use of Nepali as instructional language as a part of nationalism. The latter has emphasized implementing standardized school systems with uniform educational programs consisting of curriculum and teaching methods tested through newly established models and experimental schools (MOE, 1971). During this decade, there was a provision for the school management committee. However, it was mostly influenced by the political and bureaucratic forces at the time. This instrumentally external control of the bureaucratic structure weakened leadership development, professionalism, and academic autonomy of the school system, tending to promote the mechanical and authoritative administrative and pedagogical style.

However, the NESP and post-NESP periods are well recognized for initiating innovative school education, schooling, pedagogical approaches, educational research, and beginning a close association with international agencies to support the education system. Over time, the Education for Rural Development project conducted in the Seti zone was a pilot test based on an "innovative integrated approach" (United Nations Educational Scientific and Cultural Organization, 1985, p. 2) is understood as the milestone to shape and stimulate an educational and rural transformation. It further states that the school is a community institution instrument or force for development. Some instances of the school-related innovations developed through the project and incorporated into the education system are establishment of the resource centers, model schools, community schools, and different types of teacher training. The Seti Project was the first program that integrated school education and local community development in Nepal (Parajuli, 2014) incorporating formal, non-formal,

and informal education and learning (Pant, 2016; Parajuli, 2014; Rogers, 2014). The implications of the efforts were not limited to Nepal's primary education; they have also informed to improve the secondary education system as well.

Criticizing the centralized administration and *Panchayatization* of education by the academic community (National Education Commission [NEC], 1992), the report on the NEC envisioned an education policy and school system that was consistent with the spirit of the democratic political system. Along with the successful and result-oriented educational initiative of the post-NESP, public schooling reforms were initiated with the collaboration of transnational or global agencies working for agenda-driven economic assistance over the last three decades, as Nepal initiated many school reforms. A study by the Research Center for Educational Innovation and Development (CERID) reports that the reform contains three dimensions: technical, economic, and political elements. Technical elements are concerned with changing the contents and process of education through reform in areas such as curriculum, testing, teaching methods, and teacher training (Research Center for Educational Innovation and Development [CERID], 2008). In addition, the economic dimension is the mobilization of resources; and the political dimension is power influence and relation. During this reformative era (CERID, 2008), the concept of the community school system and community-managed school system emerged with autonomous power to improve public schooling (Research Center for Educational Innovation and Development, 2009) not only from management but from classroom teaching-learning as well.

Likewise, for the last three decades, Nepal's school education context has continuously been intervened with programs like Education for All (EFA), Secondary Education Support Program (SESP), Community School Support Program (CSSP),

and Teacher Education Project (TEP), School Sector Reform Program (Ministry of Education, 2009) and School Sector Development Program with theory of change (Ministry of Education, 2016). In the programs, teacher development training is one of the components to mold the instructional behavior of the teacher. The education plans comprise the key strategic interventions to transform Nepal's school classroom situation for a quality education through quality learning for which change in the instructional behavior is a crucial concern.

Global relevance to the formal education system is an unavoidable dynamic in Nepal's school context. From the supra system, the international or global agendas like "education for all", "right to education", "child right", "inclusive education", and "child-friendly school" are some of the imperative policy discourses and legislative provisions which are considered responsible towards changing the environment in and around the classroom. The right-related issues in education are obligatory provisions to be ensured through the constitution (The Const. art. 31, 2015) to transform the school and classroom context. This context informs that the school education system is globally interconnected. The school education and classroom practice of Nepal cannot be isolated from the global education context. For Spring (2014), global discourses are such dynamics that influence national and local educational policymakers, school administrators, college faculties, and teachers' national and local educational practices including curriculum, organizational structure, and pedagogies. At the same time, the transnational or global reform agendas of education are not only diverse, but also contradictory, and debatable. These make a contrasting orientation; for instance, standardization and decentralization, teacher autonomy and control, student-centered and content-centered (Anderson-Levitt, 2003). The impact of such

orientation on national policy, and then on classroom practice is experienced in a complex manner.

The classroom is an integral systemic unit of a school system where the teacher and students work together for learning. The vision of a school system is expected to shape the system and activities of the classroom that occur in it. However, it is a complex context where the specified space, humans, and symbols interface. The classroom space is purposefully designed, where teachers and students act and interact, under the formal or official curriculum in a systemic view. Hence, a classroom is a formal learning space for students with an instructional system (Bautista & Borges, 2013; Lomas & Oblinger, 2006). Teachers and students are assumed to attend the formal roles in the classroom. They represent human dimensions in the classroom with conscious and intentional behavior. The behavior in the classroom is conceived and dealt with pedagogically established symbolic representation. The symbols are means of interaction between teacher and student which are social objects (Ritzer, 2011), and educational objects as well, representing human intellectual effort established by human beings. Moreover, Ritzer (2011, p. 371) clarifies that "words are symbols because they are used to stand for things" with particular meanings. The symbols used in the classroom are set objects with meaning, and written and expressed words and information on the platform of symbolic interaction (Blumer, 1986) which imply the means of classroom behavioral development. The symbols used in the classroom are expected to be handled within the parameters of the formal education system. In such a way, the content is regarded as a body of symbolic knowledge to be taught in specific classrooms (Tiberghien & Malkoun, 2009). Hence, in general, the classroom setting and activities within it are found in the form of formal, symbolic, abstract, and purposeful system entities; and

also interact with the everyday human world beyond the setting which occurs with an informal, unstructured, and more natural process.

The behavior of teachers and students in the classroom is not detached from their social, familial, and everyday lives. The classroom context is a constructed space for teacher and student interaction on a specified mode of content. It appears with a blurred, interactive, and subtle relationship between the classroom context and the external world. It exists in a constantly interacting and interrelating context where there is an interdependent relationship between the internal and external worlds of the classroom and between the individual and the contextual (Cao, 2009). The teacher enters the classroom with a behavior treated through academic and professional programs and policies. The academically structured behavior is likely incompatible with students' behavior rooted in the social, emotional, and bio-psychological perception and privileged life. At this juncture, their transactional behavior is not just social orientation; it has academic learning and pedagogical implications as well. In this context, classroom transactions for transitions inevitably occur. The classroom context with content where the transaction takes place is mostly a verbal interaction using academic language. "Academic language refers to the new set of registers that many children encounter for the first time on arrival at school; a set of registers through which they will be expected to learn and participate as they move through the grades" (Schleppegrell, 2012, p. 411). So a student's knowledge, attitude, behavior, and mode of interaction are being academically formalized. In this process, because of the everyday language learned outside the school, the students are likely to face problems in the spontaneous process of academization already set as the culture of formal nature of the school, classroom, curriculum, and teacher behavior.

The school curriculum provides a framework for the teacher and student to work together interfacing the teaching and learning behaviors. The classroom is a formal context set for purposeful learning as intended by the formal curriculum. The main constituents of the formal classroom are teachers, students, buildings, and materials (Wragg, 1999) where the curriculum is the program that provides direction. Among the four elements, the teacher and student are the active dynamic elements in the classroom context. The human factors of the classroom possess socio-psychological attributes. The behaviors acted by the designated teachers concern pedagogical activities and a consciousness of the formal curriculum (Alexander & Saylor, 1974). Hence, the teacher is a key player in the teaching-learning process. S/he is recognized as an authorized professional to interpret and implement the planned curriculum in the classroom (Marsh & Willis, 1999). The student is another essential side of classroom interaction who is the subject for specified behavioral change through the classroom. Hence, it is the context where an official or formal curriculum is expected to work as intended. It is a complex setting within which a professional teacher works and causes the students to work through a course of the enacted curriculum.

In conclusion, the classroom activity categories at the center of the study are instructional behaviors of the teacher and students who are engaged in live interaction and interaction with broader spheres of systems. As a process of teaching and learning, interactive activities take place between the teacher and students enacting the curricular content. This is a formal and purposeful interaction process within the context of a complex system. Planned curriculum, also known as the official curriculum is an overtly prescriptive document for instructional behavior. In the interaction, the content that contains formal information and knowledge to be

transacted within the planned curriculum is facilitated by the classroom instructional process (Marsh & Willis, 1999). Hence, the triadic interaction among the content derived from the curriculum, a teacher developed through professional orientations, and students coming from community circles make a direct and overt influence on classroom instructional behavior.

Statement of the Problem

At the conceptual level, the role and behavior of the teacher is changing over time valuing the student participation, autonomy, and opportunity in the classroom. Teaching behavior, a professional pedagogical activity, enacted in the instructional context is a dependent variable. In this respect, instructional behavioral activities of the teachers and their students' behavior for learning in the formal setting are expected to undergo a change along with policy, program, plan, system, and academic discourse over time intending for better student learning and quality education. Nonetheless, the linear and discrete implementation of the conceptual dynamics through the teacher's behavior might have a constant confrontation with contextually complex systems dynamics.

Although students' interaction and participation of the student in the classroom are essential aspects of student learning (Zhao, 2016), the previous classroom interaction research explored that talking by students was not the norm in the classroom; students were punished for talking, even if the talking was academic (Fisher et al., 2008). Four decades back, in Flanders's study, the interaction norms found in the school classrooms were 80% of teacher talk and 20% of students talk. A survey study conducted by Pfau (1977) in the context of Nepal found that classrooms were dominated by teacher talk and teacher ideas, teacher lectures, and teacher questions with predictable student responses. It 'was also found in the study that

students did not express their ideas and opinions very frequently and the use of students' ideas in class was very rare. After four decades, Amatari (2015) found that the scenario is true, no change, in the classroom systems from the primary level through the secondary to tertiary level. This questions the existing linear systemic course of instructional behavior change or dynamism. This informs classroom researchers to study the classroom behavioral phenomena from a complex interaction of instructional systems.

Research is a continuous process that generates new meanings of classroom practices relying on empirical evidence. The study reports of Pfau (1977), (Research Center for Educational Innovation and Development [CERID], 2003), (Research Center for Educational Innovation and Development [CERID], 2007), Thakuri (2012), and many others from Nepal and other developing countries are found being concentrated on the then context, cross-sectional, cross-national comparison, and linear cause and effect relationship, reducing a whole educational phenomenon into a discrete part. The existing studies have ignored the classroom behavior enactment situated in complex systems dynamics. The behavior dynamism in such complex systems needs meaning to deal with. So this study has dealt with theoretical and empirical problems of the classroom behavior dynamism. Hence, I argue that a systematic, comprehensive, and intensive study was necessary to respond to the classroom behavioral dynamism netted into the complexity of dynamics, not addressed in the previous studies. Furthermore, if this study had not been carried out, the scholarly community would not have accessed evidence-based knowledge about instructional behavior change over time across the passage of a complex system's lifespan and about the complex influence of dynamics. Likewise, the community would have locked in the problem of linear theoretical concepts dealing with the

classroom instructional behavior. My critical concern is to uphold an alternative theoretical lens to the rooted concept of the linear interpretation of empirical findings on classroom instructional behavior dynamism.

The Rationale of the Study

Classroom transformation from teacher-centered to student-centered activities at policy and program levels has been a constant global and national effort being made over the decades. Instructional behavior is the central concern of this intended transformation. The instructional behavior in the school classroom context is interwoven with dynamic forces exerted by the embedded instructional systems. Such behavior in the complex dynamic context, I argue, requires constant process research for exploring the evolving meaning of the classroom transformation in terms of instructional behavior. Hence, this justifies the need for the present study to draw meanings of the classroom transformation by researching and comparing the behavioral status and exploring the role of the instructional forces.

The instructional behavior is at the micro-level pedagogical practice where regulative and instructional discourses interplay practically (Bernstein, 1990; Morais, 2002). Seeing this, Schwarz et al. (2009) emphasize classroom interaction research to be conducted from a critical and transformative perspective which generates evidence for instructional policy and program revision to empower students to participate in classroom instructional situations for meaningful learning. However, the efforts on the transformation of classroom interaction patterns over the decades are represented by the concept of 'dynamism' in this study. The study is expected to have contributed to the existing pedagogical discourse. Stressing the discourse concern, (Amatari, 2015) sees there is an earnest need effort to make change the scenario of the prevailing classroom interaction. A few decades back, a study conducted by Flanders (1970) reported that the students who were involved in talking more time secured higher

achievement than the students who spent less time in the classroom talking or speaking (as cited in Fisher et al., 2008). This justifies the potentiality of research on classroom instructional behavior for developing instructional policy theory to respond to the complex context of the classroom system. So, the causes of the failure of the teacher education and training initiatives to transform the classroom teaching and learning process (Pillay et al., 2017) can be diagnosed and treated with the compatible evolving approach/modality. Towards policy practice transformation, an intensive, comprehensive, and complex responsive study was necessary for exploring the evidence of the contextually and functionally interacting position, nature, and influence of the dynamics of classroom behavioral dynamism. Furthermore, the behavior-related knowledge generated through this study is expected to contribute to the understanding of classroom behavior practice in the systemic context with complex dynamics. The new dimension of behavioral knowledge is expected to create a discourse among the instructional policy developers, teacher educators, instructional evaluators, instructional researchers, professional teachers, and scholarly communities, as a whole. Hence, this was one of the pertinent problems of classroom research study for advancing and widening classroom instructional behavior knowledge toward solving the practical problem faced in the pedagogical transformation in the classroom.

Objectives of the Study

The present study conducted on the classroom behavior of teachers and students in Nepal's school context was concentrated on the following two general objectives:

- Analyze the changing classroom instructional behavior with reference to past study
- Explore the influential dynamics interacting with instructional behavior and their roles in behavioral dynamism in the classroom context

Research Questions

The specific research questions based on the objectives planned to be answered through this study were:

RQ 1. What is the present situation of the instructional activity categories in classroom?

RQ 2. Is there a difference between the classroom instructional behaviors in the present and that in the past?

RQ 3. What are the relational dynamics of classroom behavioral change?

RQ 4. How do the dynamics play a role in classroom behavior dynamism?

Delimitations of the Study

This study compares the present classroom behavior status with the behavior status that prevailed in context research conducted by Pfau (1977) within the central region of Nepal in 1974. To ensure the comparability, the present study was also delimited to the region. Specifically, the study is geographically delimited to the Bhaktapur district of Nepal (See, [Appendix A](#)) from where secondary schools were selected for this research. Instructional behaviors of only science and social studies subjects of Grade 9 are covered in this research. Classroom behavior covers a long list of activities demonstrated by the teachers and students in the formal instructional setting. The study concentrates only on those instructional behavioral activities specified in the Activity Category Instrument (ACI) as study variables. The specified instructional behavioral categories according to the ACI are given in [Appendix B](#). This study was conducted from academic and systemic perspectives.

The information collection relied on systematic observation using a GalaxyF22 mobile device equipped with a quad-cam in-built and narrative interview. In the study, the data analysis modes were delimited to an analysis of mean

differences between past and present behavior and a thematic analysis of narratives. This study did not intend to analyze the students' achievement caused by classroom instructional behavior and interaction conditions.

Operational Definitions of the Key Terms

The operational definitions of key terms give a specific and procedural meaning to the words used in the study. For a better understanding of this study, the key terms used in this dissertation are defined as the following.

Activity Categories: Activity categories, in this study, are categories of instructional behavior enacted by teachers and students. The categories of instructional behavior consist of laboratory work (open), laboratory work (structured), individual practical activities, group work/project work, library research, field trip reporting, student demonstration, student speaking, teacher questioning, notebook work, teacher demonstration, lecturing, and havoc or silence.

Complexity: 'Complexity' word means the state of behavior occurring with interactive multiple influences of various instructional systemic dimensions like teacher education, school system, personal factor, curriculum, teacher policy, etc. that can be identified by analyzing the perceived knowledge or lived experiences of classroom actors.

Deliberative knowledge: Deliberative knowledge means what is acquired by students in a formal school context as structured in the curriculum and instructed by the teacher.

Dynamics: Dynamics are the forces that play role in the behavioral change of teacher and student in the classroom instructional activities.

Dynamism: 'Dynamism' refers to the quality of being a process of instructional behaviors, but not the concept of being static and mechanical. It represents an

emergent, temporal, relational, interactional, causal, and inherent behavior. It means a process of changing and transforming behavioral phenomena in the classroom; the change can be measured by comparing past and present indicators.

Spontaneous knowledge: It notes the knowledge that is informally and non-consciously developed by children through their natural life activities beyond the school knowledge perceiving and building a self-system of understanding in the peripheries of family, community, peer groups, etc.

Symbolic violence: Symbolic violence is the imposition of the culture and values of the Rana elite and ruler culture aligned to the then British education system to Nepalese society and education system through power and structure ignoring Nepali people's cultural and educational practice.

Teacher and student behavior: The behavior of teacher and students acting in an instructional context is an intertwined process of teaching and learning in the form of verbal and non-verbal communication, interaction, and action with dynamic forces.

Chapter Two

Literature Foundation of the Problem Reconceptualization

Research is that kind of process that does not take place in a vacuum. It is the field process "whereby knowledge is developed and added to by researcher after researcher" (Anderson & Arsenault, 2005, p. 49) in a scientific manner. Hence, this chapter deals with reviewing the conceptual, theoretical, policy-related, and empirical literature. It helps to understand the theoretical and logical ground, position, and possible contribution of the study. The review critically performed has been organized under conceptual review, theoretical review, policy review, and empirical review. Based on the review, a theoretical framework was confirmed implying the conclusion of the literature review. At the last of this chapter, the implication of the review for research and dissertation development has been discussed reflecting the literature reviews and the theoretical framework. This study is based on the research gap found through the literature review. Hence, this chapter reflects issue of the study or "case" (Clare, 2004, p. 20) which was established with the backup of the relevant literature.

Intersecting Existing Concepts in Classroom Behavior

The fundamental themes dealt with in this section help organize the concept of this study which are established in this review section. These conceptual themes are dealt with as school, curriculum, classroom interactive dynamism, and interaction dynamics where teachers and students are integral human actors. These are the central idea themes to be dealt with throughout the dissertation.

Formal schooling. The emergence of schooling is regarded as a publicly organized practice (Austin et al., 2005) to educate children formally. Schooling represents a limited education process though it ought to maintain mainstreaming education in general. The classroom is the core functional sub-ordinate of school

which belongs to schooling purposes. For King and Brownell (1976), it is a purposeful organization supporting the dialogue and the symbolic interaction among teaching colleagues and students. Hence, a school is an intentionally established organization representing a complex system of symbolic operations produced by the human mind. It has also human-made intentional settings with which humans interact and influence each other. The role and function of the school is a dynamic understanding that is constructed by human thought. The functional existence of the school system represents the intersecting juncture of the contemporary conceptualization of the conscious human mind and the historical or chronological background of the school, building the life story of the education system with successive stages of development as claimed by Beeby (1966). As argued by Beeby, this background of the school with successive phases of development constitutes a classroom system and teacher and student behavior accordingly. This theoretical assumption implies to the study compares the classroom behavior of the teachers working in the chronologically different phases of the school system.

School with the ground of the human mind. The education system constitutes teacher, student, school, and classroom which is conceived as the result of the conscious human mind situated in society. The development of the education system represents the constructive human mind. As stated by Elder and Paul, the mind is regarded as a powerful source of human which performs three distinctive functions: thinking is to create ideas for situations, relationships, and problems; feeling is to evaluate based on thinking; and desire/wanting is to allocate energy to action (Elder & Paul, 2018). It creates the dimension of the man-made world which contains the works of art and science, technology, language, theories, philosophies, cultures and cultural heritages, systems, and critical arguments belonging to the knowledge of

objective sense (Eccles, 2012; Popper & Eccles, 2012) the school education system is also one of them. The products of the human mind prevailing around human beings stimulate the mind and behavior to interact further. Pfau (2017) has also stated that there are physical, institutional, organizational, and governmental systems made by humans. The modern concept and system of education is an outcome of the conscious and active human mind which has a certain purpose, frame, and formal provisions. As argued by Pfau (2017) that:

The school system is another important part of the environment affected by government decisions and laws. Other people set the curriculum for students to learn what they consider to be important. In addition, everything from teacher qualifications, school hours, costs of schooling including the taxes you pay to support the school system, the ages of children who may attend, and even the hours and numbers of days of school are based on government decisions, rules, regulations, and laws. (p. 169)

This view informs that the instructional activities enacted in the teacher and student behavior in the classroom context are to be studied as a systemic phenomenon of the human construction.

Understanding curriculum. Curriculum as understanding (Marsh, 2009; Pinar et al., 1995) informs that it is a dynamic text with the potentiality of diverse meanings and positions. The learning experience of students is the central issue in the curriculum at the level of theoretical understanding. The term "experience", in the curriculum concept, was derived from the progressive philosophy of Dewey initially (Tyler, 1957). Relying on the understanding of the learning experience, Tyler (1949, p. 1) conceived the curriculum as "an instructional program as a functional instrument", and Taba (1962), as a learning plan. Despite the emphasis on the

technical arrangement of the components, their perspectives on curriculum place the selection and organization of experience at the core for attaining the defined learning objectives. The experience involves the interaction of the individual students with the situation (Tyler, 1957), including the teacher's behavior and other aspects, and makes mutual effects and change.

For Jackson (1990) classroom life is not just limited to the academic and institutional curriculum, called the official curriculum. It confronts with hidden curriculum, known as an unofficial curriculum (Saylor & Alexander, 1974). The sources of these mutually excluded spheres of curriculum, prevailing in the classroom, are thought of as institutional manifestations and everyday life of teacher and student. The spheres that prevailed in the classroom, as claimed by Gordon (1982), are with positions of academic learning orientation and nonacademic learning orientation, cognitive environmental focus and physical and social environmental focus, and conscious and deliberative influence and unconscious and non-deliberative influence of the behavior in the classroom becoming as a blurred practice, simultaneously interfacing and integrating. The hidden curriculum, for Giroux (1983), is a theoretical element of critical pedagogy that emphasizes the notion of liberation, grounded in the values of personal dignity and social justice for students.

According to Beauchamp (1982), the curriculum has been legitimated by curriculum scholars in three dimensions which are interrelated but deal with different significance for the education field. In his argument, curriculum is recognized as a system, as a written document and plan for educating students, and field of study, which is integral to the school system. The first two dimensions have institutional implications, whereas the second has knowledge and discourse implications. Hence, the legitimating dimensions imply the whole curriculum cycle from curriculum

formulation by the authority to curriculum experienced by learners in the school system.

In the school culture throughout the world, schools practice the state-formulated formal, official, written, or standardized curriculum which is understood as an "institutional text" (Pinar et al., 1995, p. 664) that is aligned with the educational intention of a school. The core concern of the curriculum plan or written curriculum is to recommend content and teaching-learning strategies to attain the specified objectives and assessment strategies to make instructional decisions. In this way, the written curriculum is institutionally recommended for implementation in the school systems. The implemented curriculum that interacts with the teacher and students in the classroom, as claimed by Marsh and Willis (1999) and Ornstein and Hunkins (2004) is to be understood as an enacted curriculum that opposes technical and bureaucratic processes. Moreover, at the operational level of the curriculum, the constituted components are learners, teachers, content, and context Doyle and Carter argue that the two domains of curriculum and pedagogy intersect in the classroom as assigned academic tasks to students and teachers (Doyle & Carter, 1984). It is a pedagogical act in the process of curriculum enactment where the teacher, student, and curriculum interact with each other. This review redirected this study to see the classroom instructional behavior as an interaction of teaching-learning behavior with curriculum-intended activities.

Understanding of the official school curriculum of Nepal. The school curriculum is generally conceived as an official curriculum which is a state-proclaimed curriculum. It is also recognized as a formal, planned, or written curriculum (Joseph, 2010). The official curriculum, from the perspective of historical text (Pinar et al., 1995), has evolved its meanings along with the consciousness of

socio-political changes in Nepal. The official curriculum is akin system of the school and classroom system which has nourished the meanings of the curriculum through reflective practice.

Before the NESP, there was no existence of specialized government agency like today's Curriculum Development Center to work for school curriculum development (Curriculum Development Center [CDC], 2003). Despite the precise recommendations of NNEPC (1956) and ARNEC (1961), a systematic, planned, or formal curriculum with specified objectives, content, strategies, and evaluation or assessment were absent for classroom instruction. It means there was pedagogical practice without a prescription of a planned curriculum. During that time, classroom instructional plans and pedagogical discourse concerning the curriculum were tacit understandings for teachers.

As an initiative made by NESP (MOE, 1971), the CDC was an authentic agency established to develop, revise, and update the official curriculum for school education (CDC, 2003). Since that time, an explicitly planned curriculum containing instructional guidelines has been made available to classroom teachers to teach. The curriculum of the CDC at that time was understood as subject-centered, standardized, uniform, and centralized in nature. The implementation was a technical process of prototype or "fidelity perspective" (Marsh & Willis, 1999, p. 232), which is opposed by the process perspective (Marsh & Willis, 1999). These perspectives imply differences in the teacher's classroom instructional behavior.

The National Curriculum Framework (NCF) is the core document of school education in Nepal which is a living curriculum document, or like a "springboard" (Marsh, 2009, p. 19), capable enough to address a wide range of emerging issues related to education (CDC, 2007; Curriculum Development Center, 2019). The

document has ensured the decentralization, democracy, participation, and multiplicity in curriculum policies and practices in the country's changed socio-political context. It presents the policy and guidelines on contemporary curricula and other important aspects, issues, and challenges, the vision of school-level education, basic principles of curriculum development, objectives and structure of school education, and student assessment and evaluation policy (CDC, 2009). Relying on the learning areas suggested by the framework, separate discipline-led subject design curriculums are developed for the students from grades 1 to 12. The written curriculum materials of the subject curriculum consist of curriculum documents and teachers' guides which guide classroom teachers to adapt behavior in interaction with students.

Hence, the official curriculum is a formal and written curriculum that is expected to have a dominant role in classroom teaching. The nature of the curriculum greatly influences and even shapes teacher's and students' classroom instructional behavior. From this perspective, the mode of classroom interaction is so far deeply concerned with the written official curriculum.

Enacted curriculum. The enacted curriculum is a tightly knitted concept with classroom pedagogical practice where classroom talk is an explicit key for student learning. Classroom talk and developing dialogue in the classroom signify quality and essential pedagogical practice (Edwards-Groves & Hoare, 2012). The talk that occurs in the classroom is explicit, formal, deliberate, and purposeful. Therefore, classroom interaction belongs to a grid of institutional relations, in that, the ways that people talk and interact in the classroom are, in some specific, recognizably different from how they talk and interact elsewhere.

Behavior in the classroom is the micro-level dyadic interaction between participating teachers and students that comes under macrosystem dynamics. The

macro-level interactional dynamics, like national educational policy, teacher professional policy, and other areas prevail externally in the classroom setting. The instructional behavior of professional teachers is expected to be controlled and monitored by their meta-behavior (Amran et al., 2021) closely integrated with metacognition (Amran et al., 2021; Flavell, 1979) built through meta-teaching of teacher education and university education. The instructional discourse emphasizes the classroom transformation from teacher-initiated talk to student-initiated talk (Flanders, 1974) or from teacher-centered activities to student-centered activities (Caldwell, 1971) in terms of classroom behavior occurrence.

The classroom behavior demonstrated by teachers and students can be categorized as verbal and nonverbal behavior. The teacher-student interaction in the classroom is primarily regarded as verbal interaction which subsumes classroom talk, verbal communication, and overt verbal behavior (Amatari, 2015; Baker, 1992; Flanders, 1968, 1974). The process of verbal interactive behavior implies an action-reaction or a mutual or reciprocal influence between individuals, and teacher-pupil in a classroom setting (Amatari, 2015). Flanders (1968) has categorized classroom interaction behaviors into ten categories and four classifications: teacher's indirect influence (accepting feelings, praising or encouraging, accepting or using students' ideas and asking questions), teacher's direct influence (giving directions, lecturing, and justifying authority or criticizing), student talk (student response and student initiation) and silence or confusion (Amatari, 2015; Baker, 1992). The interaction in classrooms, in this study, is the verbal expressions of teachers and students which are regarded as the major processes in classrooms. Verbal interaction is a meaningful and purposeful face-to-face action of talking, dialogue, conversation, or other two-way communication between a teacher and students, or between students in a cohort. It is

the core process of any classroom and the foremost concern in teaching. This means the heart of teaching and learning at schools lies in classroom interaction (Robinson, 1994). On the other hand, the activity-focused instructional behaviors prevailing in the classroom are categorized as indirect activities (laboratory experience: open-ended, laboratory experiences: structured, group project work, student demonstration, student library research, and student speaking); teacher questioning; and direct activities (workbook work, teacher demonstrations, and lecture); and general havoc (Caldwell, 1971). Hence, Caldwell's activity categories contain both verbal and non-verbal instructional behaviors.

To sum up, classroom behavior is at the center of the school with its perennial system and curriculum policy. In this context, it can be critically summed up that the classroom mode of interaction is determined by longitudinal and lateral dynamics. The longitudinal dynamics represent the historical antecedents of the school system and teacher development in the context of Nepal. Laterally, a teacher at first is a person with a system and teaching is an intensively personal profession (Tusin, 1999). There is an interplay of personal and professional attributes of a teacher in both the school premises and classrooms. There is a constant interaction and reciprocal influence between a teacher's personal and professional positions, as the former is informal and the latter formal. In the classroom context, the official curriculum and the teacher's lived experience curriculum interact in the process of instruction. This implies that what the teacher understands and interprets the curriculum, influences his instructional behavior.

Dynamics to the dynamism of the classroom. Byrne (2014) argues that "complexity deals with dynamic systems. Dynamism is change ." (p. 45) The change is evolutionary and emerges in the process. The dynamism in a classroom is

interactional dynamism which, according to Pauget and Tobelem (2019), allows the co-creation of knowledge. It is a complex consequence of the dynamics as opposed to mechanical processes in a human and social context. It is relational to and dependent on the dynamics of classroom interaction phenomenon. This widely interacting sphere informs an interrelated, evolving, and unpredictable behavioral phenomenon that gives a sense of an ever-changing process of classroom events in a holistic manner (Burns & Knox, 2011). Burns and Knox state further that dynamism is an unavoidable characteristic of a classroom.

Instructional dynamics are the influencing forces of classroom behavior dynamism. The influence exerted by the dynamics is a complex and multifaceted phenomenon associated with classroom climate which intersects with the behavior of teachers and students (Montague & Rinaldi, 2001) in the instructional context. Mulcahy et al. (2015) have presented such classroom dynamics into three categories which are recognized as discursive, material, and social. The first category represents the policy or vision for student-centered learning, personalized learning, etc.; the second category for a traditional or innovative classroom in terms of technology; and the third category for a shared social structure set up by a school system (Mulcahy et al., 2015). Similarly, Burns and Knox (2011) also present institutional, instructional, personal, and physical factors as dynamics of classroom behaviors. Hence, the classroom pedagogical action and interaction are the behaviors of teacher and student which constantly interface with the dynamics.

Classroom interaction. The central concern of interacting behavior in the classroom is to enhance academic performance. In terms of the learning environment, a teacher has the authority to foster an academic climate. The interaction that occurs between a teacher and student in a classroom is for academic learning (MacPherson,

1984; Robinson, 1994). It is the foremost means to academize the teachers and students who are engaged in interaction within the school premises. The interaction in classrooms enhances the academic knowledge of the students. Conversely, the development of the academic language of the students promotes teacher-student interactional behaviors. The interaction is the process occurring in classrooms for formal language learning. In this way, the school and the classroom deliberately encourage the use of academic language which is more or less different from the everyday language of students. Thus, the academic language for verbal interaction is a fundamental instrument for the students to learn in the classroom through classroom verbal interaction. From this perspective, classroom talk is advantageous for the development of language and literacy skills, thinking skills, content learning abilities, social skills, and psychological qualities (Zwiers, 2011). Hence, as the students' grade level increases, the academic language competency also increases which matters more for interaction between teachers and students. This theoretical consciousness helped this researcher to select Grade 9 considering the students' mental and psychological attributes who had formal language competence for classroom verbal interaction. In the research, a range of overt verbal behaviors were recorded, observed, and coded.

Behaviors of teacher and student. The behaviors in classroom activities are categorically aligned with the teacher's and the student's behavior. In the sense of process, they are conceived as teaching and learning behaviors, which are overt, observable, and recordable. Such teaching behavior of teachers is expected to be professionally treated and developed so that it is governed by meta-teaching (Chen, 2013), which tends to influence students' behavior, knowledge, and attitudes consciously. The behavior of the teacher in the classroom is regarded as deliberate and goal-oriented. On the other hand, the student's learning behavior at the beginning

is more fluid, natural, spontaneous, and academically non-conscious than in their latter life.

The behaviors of the teacher and students in the classroom are relational and dependent. How to act, interact, or transact between teacher and student is a relational process that communicates messages verbally and non-verbally (Richmond et al., 2015). Moreover, Motter and Beebe argue that instructional communication [instructional behavior] is a transactional process aligned with highly relational behavior characterized as a mutual influence which is again influenced by educational psychology, pedagogy, and communication disciplinary foundations. The first two foundations emphasize student and teacher respectively and the last one emphasizes the meaning of messages that stimulate their mind and relates to their behavior. Hence, the relational process is not limited to teacher and students; it has interactive relations with institutional, pedagogical, personal, and physical factors as well (Burns & Knox, 2011). Teaching behavior is less complex and difficult than instructional behavior. The fact is that the act of teaching and particularly the phase of instruction is a highly complex phenomenon. It is a process that simultaneously involves several complex and interacting forces. Some way, like video recordings, is necessary to capture the complex instructional act at the moment it occurs and store for a time being (Hough, 1966) for the purpose complexity analysis. This informs to have a review of theories from an interdisciplinary approach with viewing a confluence of philosophy (person), psychology, pedagogy, and system to classroom behaviors.

Theoretical Bases: An Eclectic Approach

The theoretical review is oriented to theoretical eclecticism which emphasizes integrating multiple theories around the problem. Relying on this approach, the review involves the intersecting interpretation of the established educational theories

consisting of historical, philosophical, psychological, pedagogical, political, and systemic phenomena. This researcher believes in the claim made by Anderson and Arsenault (2005) that the patterns and theories govern professional human behavior. This researcher also has the assumption that classroom activities are connected with the human, system, and physical worlds functioning intentionally and voluntarily or formally and informally. My argument for classroom pedagogical practice is that it is a complex systemic process occurring through an interplay of multiple dynamics. The review leads to a holistic and integrated meaning of the classroom practice implying in the teacher's and student's behaviors.

Theories of teacher transformation. A teacher is not a by-birth identity. The identity is embedded into the professional attributes that are deliberate formation along with one's own choice. It is a transformation of a person, by becoming than being a classroom professional teacher.

Teacher as being a person. Human beings are fundamentally persons with human nature, that has inherent capacities to construct various meaning and identities (Smith, 2011). Human nature is represented by self or person which is the core concern in the field of philosophy, psychology, and sociology. In this context, education is a means and the teacher is a human actor in bridging humans in nature and humans in construct. A teacher is an integrated form of both nature and constructs in practice. Thus, my argument is that a teacher is human with the self or personhood and something else.

Theory of self. A human being is inbuilt with self. As stated by Cooper and Olson (1996, p. 78), "Our sense of self is much more dynamic, mysterious, complex, and multifaceted". A teacher is a human with self. The self is something associated with a person, which has a development; it is not initially there, at birth, but arises in

the process of social experience and activity (Cooper & Olson, 1996; Mead, 1962). A person is characterized as a conscious, reflexive, embodied, and self-transcending center of subjective experience, durable identity, moral commitment, and social communication which is regarded as the efficient cause of his or her responsible actions and interactions (Smith, 2011). In the person, there is a constant interactive play of 'I' and 'me'. Self represents the 'I' and 'Me' from different senses. 'I' is the 'self as knower', which is subjective belonging to an individual value, but 'Me' is the 'self-as-known', which is objective belonging to a group value (Damon & Hart, 1982; Hermans, 2002; William, 1984). The 'I', the knower, presents every dimension of the life of a person. The I is an active self thus different from Me (Wagner, 1983) (Wagner, 1983). As the authors mentioned, the 'I' is characterized as continuity, distinctness, and volition. The continuity of the self-as-knower is reflected in the sense of personal identity (Hermans, 2002). However, the 'I' and 'Me' are inseparably interlinked in the human self (Mead, 1962; Wagner, 1983; William, 1984); and a constant interaction to transform the human self as a person with an identity. In conclusion, the self is considered the conscious existence of a person (Eccles, 2012). It implies that the 'self' of teacher and student human factors is inherently in the process of development. In this study, teachers' selves have been considered as inherent dynamics of the instructional behavior.

Theory of mind. The mind exists within a person. It is formed through social relations and interactions among human beings. This is the admission of the higher level of the social process of experience and behavior which presuppose the existence of the mind or becoming a product of the mind (Mead, 1962). Mead and his contemporary authors emphasized mind and self more in their writing which are micro aspects of a person from the perspective of Ritzer. As stated by Ritzer (2011), a

wide range of social institutions are in the macro contexts of a person which have diverse influences on the person. The macro context, with which a person interacts since his or her birth, is even wider than the social setting. For Popper and Eccles, the whole world is divided into three interactive worlds: World 1 which consists of physical objects and states (inorganic, organic/biologic including human brain, artifacts); World 2 which consists of states of consciousness (subjective knowledge, experiences of perceptions, emotion, memories, dreams, imagination); and World 3 which consists of knowledge in the objective sense (cultural, philosophical, theological, literary, historical, technological and theoretical systems, codes, symbols and expressions) (Eccles, 2012; Popper, 1985). The mind is conscious and involved in creating a man-made environment (Pfau, 2017), regarded as World 3 consisting of the creative works on art, science, technology; and language and theories for a human being (Popper, 1985). Similarly, Ådlandsvik (2012) presents an existential narrative on the inner and outer worlds' interaction and penetration of each other in human life. The experience shapes and makes meaning of the life living with them. Adlandsvik argues that there is a persistent interactive relationship between the past, the present, and the future in an evolving manner. In this way, a teacher is a product of the human mind and is inbuilt with the mind in the socio-psycho-physical contexts. A teacher, being a person, constantly interacts with these three interactive worlds with the involvement and interaction of his or her body, brain, and mind. It is an integrated form of natural, man-made, and social environmental settings (Pfau, 2017) that is perceived by a person at every moment involving brain and body mechanisms. The interaction between the human brain; which is bio-physical, reflexive, and self-conscious in attribute; interacts with the mind; which is bio-psycho-social, conscious, and reflective in attribute within the bio-physical structure of the brain. The cognitive

process is a mental process that plays an interacting role between the brain and mind (Başar, 2008). This occurs between world 1 and world 2 consisting of the interaction with the psyche, the self, and will (Eccles, 2012; Popper, 1985; Popper & Eccles, 2012). It is the context in which an integrated mind of perceptual information system and conceptual information system is built (Mandler, 2004) within a person. Hence, my argument for this study is that the mind and self of a teacher, as a person, emerge forms of reflexive and reflective behavior through a constant interaction of natural, man-made, and social system contexts.

Theory of multiple identities. A teacher is in the process of identity construction which is interpreted from diverse perspectives. The historical, sociological, psychological, and cultural contexts of teachers not only influence identity but also shape it (Cooper & Olson, 1996; Henry, 2016). The work and career of a teacher inevitably begin by recognizing the changing context within which the work is undertaken and the career is constructed (Ball & Goodson, 2005). The interaction with the sociopolitical context affects the professional disposition of teachers. Ball and Goodson state:

Changes in the financing in education, in the degree of political intervention in school matters, and in the views of and general level of esteem for teachers held within the public at large, have and are having, profound effects upon the ways that teachers experience their jobs. (Ball & Goodson, 2005, p. 2).

In these contexts, the teacher's I-self and teacher agency become more active than any other identity position. Thus, the formation and development of self-identity depend on a series of past events, feelings, observations, interactions, and experiences of a person. This leads to conflict between the perceptual level of understanding and the conceptual level of understanding. Beauchamp and Thomas (2009) state that

teacher identity is not an absolute understanding. It is a relative and connected understanding which is inherently a complex endeavor. According to them:

One must struggle to comprehend the close connection between identity and the self, the role of emotion in shaping identity, the power of stories and discourse in understanding identity, the role of reflection in shaping identity, the link between identity and agency, the contextual factors that promote or hinder the construction of identity, and ultimately the responsibility of teacher education programs to create opportunities for the exploration of new and developing teacher identities. (Beauchamp & Thomas, 2009, p. 176)

In the excerpt, except for the last concern, the former concerns of identity matter are directly connected to personal identity. The last concern is the development of the professional identity of the teacher which is in general conceived as intentionally and formally made.

In conclusion, a teacher as a person, beyond the school context, carries out his or her life in an informal, self-directed, nonprofessional, familial, and community context which contrasts with the formal, professional, and school context life. Hence, education is the human construction that signifies growth and transformation, not only of culture but persons too (Danielewicz & Yen, 2018). A teacher, being a person, possesses a multidimensional, multilayered, dynamic nature of identity that intersects with contextual factors that elicit differing and possibly contradictory teacher identities (Cooper & Olson, 1996). The multiple I's of teachers rooted in the historical, sociological, psychological, cultural, and political contexts are in a dialectic tension in becoming a teacher. The longitudinal and lateral nature of interaction with the variable contexts keeps on the construction and reconstruction of the "identity-in-practice" (Trent, 2010, p. 154). One of the most important is that most approaches still

fail to value the veteran teacher, and they fail to appreciate the nature of the varying life circumstances of different teachers as these relate to the teacher as a person (Fullan & Hargreaves, 2013). It seems the teacher's person has been neglected. These might influence the classroom interaction where the teacher is acting inevitably with personal identities or selves. Therefore, the role of the personal selves cannot be ignored as dynamics to classroom interaction.

The course of becoming a teacher. Being and becoming are a person's life processes. In the formative period of a professional career, everyone is in the process of becoming. Becoming is a place of transition (Phillips & Carr, 2014) in one's professional development. It is the process that reveals how a person becomes someone with a particular identity. It is one's decision, but not a compulsion, to become a teacher (Kearney, 2013). The process of becoming a teacher means entering a teaching career and profession relying on own choice in life. In the field of teaching, it means how a student becomes a teacher (Danielewicz & Yen, 2018). Teaching is a learned profession (Shulman, 1987) that is defined in terms of requisite knowledge, skills, and abilities or tasks and understandings (Reynolds, 1995). It requires opportunity as specified by a programmatic framework. The process of becoming and being is a longitudinal framework of learning to teach continuum a teacher which is categorized into four phases in terms of teacher development: pre-training phase, pre-service phase, induction phase, and in-service phase (Feiman-Nemser, 1983). The transformation within a person from being a student to being a teacher needs the attributes to be developed that are required for a professional teacher so that s/he would be recognized as a key actor of classroom pedagogical practice in a school system. In the broad spans, one goes through the student, student-teacher, and teacher continuum of development. During the student period, one observes, imitates, and

learns (Bandura, 1971) the teaching acts of the teacher implicitly. But, an explicit journey to becoming a teacher starts from being a teacher education student to becoming a novice teacher (Shulman, 1987), then a professional teacher with knowledge, skill, and attitude. The identity as a teacher with a professional role is made through those processes that are enacted by other persons, discourses, and institutions (Danielewicz & Yen, 2018). To be precise, they are teacher educators, knowledge and pedagogical methods, training institutions, colleges of education, and universities.

The core concern of teacher development is knowledge bases for becoming a teacher within a programmatic framework of teacher education. The type of mind that represents the knowledge bases for becoming a teacher is an important issue in teacher education. In response to the issue, Shulman (1987) has categorically proposed subject content knowledge, pedagogical content knowledge, and curricular knowledge. His preferred knowledge category, the pedagogical content knowledge (Shulman, 1986, 1987), further stimulated the scholarly mind of the theorists. It has been criticized as a static or set of product knowledge bases rather than a constructive process (Cochran et al., 1993), as a narrow and transmissive perspective (McEwan & Bull, 1991), and as ignorance of the existence of "self" (Turner-Bisset, 1999). However, the criticisms became sources of reformation, extension, and specification of the knowledge bases for becoming a teacher. The knowledge bases, as claimed by Moore and Hopkins (1992) are general knowledge consisting of knowledge on communication, history and government, science, mathematics, economics, geography, physical education, etc.; specialization knowledge with depth and mastery of subject area consisting of sequence, structure, concepts, ideas, values, facts, and methods of inquiry; and professional knowledge containing the educational

foundations, (i.e., sociological, philosophical, psychological and historical facts, methodologies, and principles, etc.), pedagogical knowledge (curriculum, principles, methods, and skills), research knowledge (i.e., research from educational psychology and behavioral sciences), and practical application of the foundations, pedagogy, and research into modeling, field-based experiences, student teaching, etc. For Reynolds (1995), they are general subjects/liberal arts, content to be taught, general principles of teaching and learning, and content-specific pedagogy. These knowledge bases of the teacher education programs are expected to become an explicit cognitive intervention to establish a meta-cognitive thought system in their mind which makes a student teacher a self-regulated professional. Hence, they are recognized as meta-cognitive professionals (Duffy et al., 2009). The meta-cognition of a teacher for teaching begins to develop when one joins a university program for teacher development or teacher training programs. The education programs are expected to bring change to the teacher's pedagogical content knowledge (PCK in short) (Koehler et al., 2013; Mishra & Koehler, 2006) which acts as meta-cognitive knowledge for pedagogical behavior in the classroom.

Progressivism is the foundation philosophy of teacher education in Nepal.

Before entering the progressivism context in Nepal, this opening paragraph zooms up on the pedagogical assumption of the widely accepted philosophy. As argued by pragmatist John Dewey, progressive education opposes the imposition and transmission of a stale body of information and skill, standards, methods, and experiences of mature adults to children who are slowly gaining maturity (Dewey, 1938). Its central tenet is the theory of experience which seeks an organic connection between education and the personal experiences of learners; and it further proposes "a plan of learning by experience" (Dewey, 1938, p. 26). For Dewey, two principles,

namely continuity, and interaction, are found working with experience in the process of learning. Continuity refers to the experiential continuum as a longitudinal process of experience. Interaction, on the other hand, is the lateral aspect of the experience, which concerns transaction between the individual and the environment or situation, including the human activities and things, topics in talking, events on appearing, subject matter to be approached, learning materials as availed, books as found, and any other occurring around one. Life experience also deeply matters to a democratic political state and social control (Dewey, 1938). Kilpatrick, a key advocate of progressivism, establishes a relationship between learning and experience. In his view, learning means recording and describing the facts that are only some parts or aspects of an experience; similarly, learning affects pertinently one's further experience (Kilpatrick, 1945). Interpreting Dewey's philosophical prescription, education-related phenomena are to be viewed as deliberately conducted practices that imply that the meaning of words like *learn*, *teach*, *curriculum*, and *subject matter* bear intelligent, conscious, purposeful, intentional, and dynamic, rather than static, process intertwined with pupils' life experience (Dewey, 1922a; Kilpatrick, 1953) leading a progressive meaning and understanding.

Hence, democratic education possesses an ideal principle of continuous reconstruction or reorganization of experience, of such a nature as to increase its recognized meaning or social content, and as to increase the capacity of individuals to act (Dewey, 1922a). Kilpatrick further specifies and suggests six guidelines for the educative process; such as respect for personality, learning inherent in living, the whole child and by-product learning, meeting current needs, guidance for quality and degree of living, and socially useful activities that are foundationally based on human value, ethics, democracy, psychology, and social life.

In the perception of Guthrie, a reputed educationist as well educational researcher, the progressive classroom is that which focuses on students' culturally defined learning processes and provides opportunities for students to discover or construct their knowledge from a young age, which the teacher facilitates (Guthrie, 2011). For Beeby, Guthrie, and many other educationists, progressive education and classroom practices are regarded as an advanced stage of educational development coming through the many lower evolving stages in a natural and slow process. The central tenet of progressivism is "a unilinear and inevitable process of socio-cultural development" (Guthrie, 2011, p. 5). It is recognized as the meaning stage for Beeby (1966) and the democratic stage Guthrie (2011), which are the apex level of pedagogical advancement in their models, is parallel to Gidley's "post-formal pedagogies" (Gidley, 2016, p. 145). The stages of the models provide a theoretical frame to compare classroom practices happening in the present with the past within and across the countries.

Reviewing the epoch of development of Nepal's public education system, we come to know that the widely recognized progressivism philosophy of education was adopted replacing the elite education practice of the coercive political power of the English system of education introduced by the First Prime Minister of the Rana regime. Historically, this school system is regarded as the first formal school system and modern school education and classroom system (NNEPC, 1956) practicing the approach of "elite schooling" (Gidley, 2016, p. 73) and "selective exclusion" (Rappleye, 2019, p. 9). Initiating the national education system of Nepal, H. Wood, Professor of Education at the University of Oregon, who was a Ph.D. student of William Heard Kilpatrick, a key figure of the American progressive education movement and also known as a successor of John Dewey, played a historical role to

set up progressive philosophy of education in Nepal by positioning it at the heart of the NNEPC report, titled "Education in Nepal". Relying on the report, the College of Education, a fully-fledged degree-granting institution, which was the focus of Wood's plan, was successfully established with the help of eight Nepali educational scholars trained at the University of Oregon for one year on progressive and modern pedagogy (Rappleye, 2019). As an integration of the empirical and experimental philosophy of Dewey (1938), Rappleye (2019) found the key feature of the then College was "a Demonstration School [Lab School] attached directly to the College which was used to train college students (practicums), provide opportunities for observation, experiment with new lessons, and try out new teaching materials" (p. 127). He further claims that it was a replica of John Dewey's famed laboratory school established at the University of Chicago in the 1880s and a pillar of experimental, progressive approaches long championed by Kilpatrick.

In conclusion, all the learned people are not recognized as teachers in terms of professional attributes. To be a teacher, one must transform oneness and identity as he or she moves through programs of teacher education and assumes the position of a teacher in challenging school contexts (Beauchamp & Thomas, 2009). The academic program, teacher training, and professional development program are expected to work as the threads that would craft a seamless relationship between becoming a professional teacher from being just a person. In the context of Nepal as well, after the advent of democracy and the public education system, the classroom pedagogical transformation has been constantly being focused on the educational commissions, plans, projects, and programs in Nepal (Thakuri, 2012) intending to transform pedagogical activities.

Discourses of being a teacher. The term teacher is complex understanding with multifaceted dimensions evoking diverse discourses. Viewing a teacher from one or two dimensions does not make a pragmatic understanding. Because the teacher in concept is at a juxtaposition of views on existence in an intertwined context of a complex system of reality. Hence, the being of a teacher has formal theoretical interpretation from philosophy, professionalism, psychology, and legal provisions.

Being a teacher means finding a teacher-self as “Being -in-the-world as a whole” (Heidegger, 1962, p. 176) in the world of classroom teaching; where, as argued by Heidegger, *Being –in* becomes a formal existential expression of the state-of-mind as a reflective disclosure. A teacher, like all human beings, asks himself or herself- Who am I? Why am I here? Why am I doing this? What is the sense of that? (Hostetler et al., 2007). This suggests identifying the self, feeling responsible, and becoming a meaningful maker of professional activities. The meaning-making, for Dewey, is not just a mental task but involves a release in action (Dewey, 1922b; Hostetler et al., 2007). As a teacher, it is undergoing a fundamental change in one’s attitudes, perceptions, conceptions, beliefs, abilities, and behaviors (Baird, 2004). Okrent argues that being is not a static existence. Rather it is a process of becoming of being (Okrent, 1978) that is a professional teacher goes through professional career stages of beginner, experienced, master, and expert (National Center for Educational Development [NCED], 2010). From the perspective of pedagogical skill development, the five stages involved are the novice, advanced beginner, competent performer, proficient, and expert stages (Benner, 1994; Berliner, 1988; Chongbang, 2016; Dreyfus & Dreyfus, 1980; Dreyfus et al., 2000) through which they become a professional expert (Hart, 1893). Hence, being a teacher is becoming a whole professional teacher.

Being a professional teacher with a new career involves the process of teaching to learning and learning to teach and the process of development of teaching expertise. Stobart (2014) notes that teaching expertise is the product of user experience to develop powerful frameworks in which to make sense of both familiar and unfamiliar information. In this sense, the classroom teacher is in the process of becoming an expert learner and expert teacher. As argued by Graham and Phelps (2003):

Being a teacher means being an expert learner, not the least because teaching involves the capacity to monitor and self-regulate the learning process to enable decisions about what knowledge is required in particular contexts, along with how, when, where, and why particular strategies are actioned. (p. 12).

Furthermore, they claim that reflection and meta-cognitive learning processes are constitutive of lifelong learning, which are perceived as central to effective teaching practice. In the professional expert learning of a teacher, metacognition, and reflection are at the heart of roleplaying factors. Both meta-cognition and reflection play a crucial role in a teacher's classroom process as well. Emphasizing this perspective, Graham and Phelps (2003) postulate an integration of skill and identity agendas of teachers through meta-cognitive and reflective approaches to practice.

The mechanism of thought systems belonging to self-system thinking (Marzano & Kendall, 2006), meta-cognition is a conscious and higher-order process of the human mind that is responsible to control, regulate, and execute static and nonconscious cognition. As indicated by Kuhn and Dean, it is defined in similar terms as awareness and management of one's own thoughts (Kuhn & Dean, 2004), or thinking about thinking (Kuhn & Dean, 2004; Livingston, 2003). The meta-cognition

concept developed by Flavell (1979) is constituted of meta-cognitive knowledge and meta-cognitive experience. The former dimension of meta-cognition consists of the storage of conscious knowledge of a person and his/her learning process, of a task and its nature of the person, and of appropriate cognitive and meta-cognitive strategies about when and where to use. Similarly, the latter dimension is related to the performance of meta-cognitive strategies and regulation to attain the cognitive goal (Livingston, 2003). For Flavell, it is not just cognitive performance, it is effective as well. The roles of meta-cognitive experiences or strategies in the life of a teacher, as claimed by Flavell (1979), are:

That stimulates a lot of careful, highly conscious thinking: in a job or school task that expressly demands that' kind of thinking; in novel roles or situations, where every major step you take requires planning beforehand and evaluation afterward; where decisions and actions are at once weighty and risky; where high affective arousal or other inhibitors of reflective thinking are absent.

(p. 908)

In the context of teacher professional development, meta-cognition is a mechanism of mind that facilitates teachers to develop their professional learning and students' higher-order and critical learning in the classroom. It consists of knowledge, awareness, and control aspects; and the affective domain which is associated with commitment, caring, positive attitudes, self-confidence, and self-assurance involves teachers' teaching improvement. Hence, meta-cognition serves as a mechanism for problem-finding, setting adaptive goals, identity-building, and value clarification (Lin et al., 2005) . Kuhn and Dean (2004) believe that meta-cognition is the process of interiorization of Vygotsky and Piaget's talk, social constructivism, or constructivism.

Reflection is the process of learning from experience. It is positioned as the lens through which being a teacher is understood, developed, and practiced (Graham & Phelps, 2003). Furthermore, they claim that reflective practice is more than just thoughtful practice. A teacher is a reflective practitioner who reflects in practice (Schon, 2016). The setting of a teacher's pedagogical practice is complex, unpredictable, uncertain, unique, and value conflicted where the technical rationalistic model of the teacher hardly functions. Since, technical rationality is an objective, instrumental, technical, linear, and rule- and technique-guided practice. Schon argues that being a constructive and reflective teacher requires the employment of the perspective of knowing-in-practice and then reflecting in practice in a complex situation (Schon, 2016) that ultimately leads to a new practice and approach. The teacher's teaching activities are a construct-in-action (Moore & Hopkins, 1992). Like Schon, Kitchen and Petrarca have opposed the rational and technical understanding of reflective practice, and state that reflection is a way of *being* for teachers, rather than just a practice (Kitchen & Petrarca, 2016). As argued by Schön (1987), a qualified professional's critical self-reflection opposes the practice of an unreflective professional teacher's stand. Larrivee (2000) further advanced perspective then insisted:

Critical reflection involves a deep exploration process that exposes unexamined beliefs, assumptions, and expectations and makes visible our reflexive loops. Becoming a reflective practitioner calls teachers to the task of facing deeply rooted personal attitudes concerning human nature, human potential, and human learning. Reflective practitioners challenge assumptions and question existing practices, thereby continuously accessing new lenses to view their practice and alter their perspectives. (p. 296)

Reflective practice is the process of pedagogical transformation beyond professional expertise and technical expertise. For Larrivee, it moves through the examination stage, at which the teacher questions, challenges, and desires a change in the current practice; to the struggle stage, at which the teacher works with fear associated with inner conflict, surrender, uncertainty, and chaos; and to perceptual shift stage, at which teacher transforms classroom activities reconciling, personally discovering, and performing a new practice (Larrivee, 2000). For this change process, critically reflective teachers are expected to be on high alert for the presence of dominant ideologies in the educational process and decision-making (Brookfield, 2017) in a classroom context. Presenting a comprehensive reflective practice, theorists claim to be reflexivity which intertwines reflection, self-reflection, and critical reflection and relates the self with social context, types of knowledge-making, and research for everyday practice (Fook & Gardner, 2007). For Bleakley (1999), it is holistic reflexivity and a reflective process for a being teacher. Hence, to transform classroom pedagogical practice, a teacher's being has to act with critical reflection and reflexivity which are deeper and wider than Schon's reflection-on-action and reflection-in-action. The teacher's reflection intertwines classroom autonomy which counters the bureaucratic and institutional linear system.

Teachers and their professionalism are interpreted from diverse perspectives. According to Wragg (1999), the teacher is understood as a paid professional under the law of the State assigning duty of care. Teachers are given certain powers and responsibilities to fulfill what the law calls the duty of care. A teacher with the status of professional expertise claims to have a social mandate, autonomy, and license (Schon, 2016), which manifests the notions of the formal bureaucratic system and technical rational practice. In the school context of Nepal, the teaching license has

been set up as a prerequisite provision to enter the teaching profession since the last decade. The provision was brought into practice to recruit qualified, skilled, and committed people in the teaching field. Pre-service training and a teaching license are mandatory before hiring people for a teaching position (NCED, 2010). It means that teachers enter the classroom teaching with the State specified criteria ensuring the quality of a professionally competent teacher.

In conclusion, being a teacher involves understanding and working in a school system, teaching across a broad curriculum, interpreting theory and practice, creating a climate for learning, valuing and modeling lifelong learning, working collaboratively with others, responding to social issues and imperatives, and developing skills and strategies (Graham & Phelps, 2003). The professional practice in such circumstances is complex, uncertain, unstable, unique, and value-conflicted situations (Schon, 2016) where the teacher's meta-cognitive process, autonomy, reflective practice, and reflection in action are expected to identify the teacher himself/herself with the self-thought system as a reflective professional being.

Theoretical grounds for understanding school children. As stated by Vygotsky (2012) pedagogy depends on educational psychology. Psychology matters in child development where learning is a twined process. Vygotsky finds an interactive and dependent relationship between learning and development. Classroom instruction for learning has to stimulate the development of children (Vygotsky, 2012). The learning caused by the classroom interactional environment has a meaningful role in child development. Various theoretical lenses are available to understand the child in the classroom context and everyday life. The "school age" termed by Erikson falls in between the childhood and adulthood stages of human development (Erikson, 1968, p. 122) which covers from the age of six years to

seventeen years life-span and is identified with distinct inherent features of human development. From the theoretical perspectives of developmental psychology, the formal school age covers late childhood through the early adolescence stage (Erikson, 1968; Hurlock, 1980). Children in basic and secondary education have a natural psychological ground of maturation and development in the areas of physical, mental, emotional, social, and linguistic development.

Cognitive development theory. Cognitive developmental psychologist, Piaget (1964) argued that a child enters school at the end of the pre-operational stage or with the beginning of the concrete operational stage and transit to the formal stage of development. He further states that among the determinants, like maturation, experience, language transmission, or educational transmission, a single factor is not sufficient for perfection in a development stage. Therefore, equilibration of the three factors is required which is the process of assimilation and accommodation for the construction and reconstruction of sequential structural stages or schematic structures of thought. The latter two factors, i.e., experience and language transmission, are expected to have pedagogical functions in the development of a child. "A ready and spontaneous attitude of mind" (Piaget, 2001, p. 163) of children and their activities, developed across the child's infantile and early childhood everyday life, regarded as a high egocentric life span, is likely incompatible with the school and classroom environment since school and classroom emphasizes the formal, systematic, and academic attitude of mind and concept (Vygotsky, 2012). He further argues that "scientific concepts that originate in classroom instruction could not but differ from the concepts evolving in everyday life" (Vygotsky, 2012, p. 167). The scientific concepts that avoid the spontaneous concepts and activities of the children evolve under systematic cooperation between the student and teacher. The spontaneous

knowledge and concepts gradually decrease as the age of school children advances from pre-operation to concrete operation and formal operation of mind or from early childhood to late childhood and adolescence; and emerges the mental and conceptual position of scientific, formal, deliberative and systematic attitude in the children. In this process, classroom instruction is one of the principal sources of the school child's concepts and is also a powerful force in directing their evolution (Vygotsky, 2012). In this regard, it is the role of the teacher to manage the spontaneous and nonspontaneous concepts and behaviors of the classroom children through deliberative pedagogical techniques.

Learner's individual differences. The diversity of learners is an unavoidable phenomenon in the classroom context. As stated by Snow (1986), students in any age group and any culture differ from one another in various intellectual abilities and skills, prior knowledge, interests and motives, and personal styles of thought and work during learning in the classroom. This implies that the teacher needs to address the differences when s/he becomes engaged in interactive instruction. The sources of such diversity are rooted in the mental process, preferences of working, and socio-cultural influences on the students. Individual differences have been dealt with under various concepts such as multiple intelligence (Gardner, 1999, 2011), learning styles (Curry, 1983, April; Kolb & Kolb, 2005; Sadler-Smith, 1996), and sociocultural contexts. Such diversities or individual differences counter conventional classroom instruction.

Multiple intelligences. Intelligence is one's cognitive competence which is explicitly performed to solve problems. For Woolfolk (2005), it is the ability or ability to acquire and use knowledge for solving problems and adapting to the world around. Old concepts, such as Simon-Binet's single intelligence and Piaget's cognitive

structures, are opposed by Gardner's theory of multiple intelligence. Gardner's theory implies that the students in the classroom possess diverse intelligences that include logical-mathematical, verbal/linguistic, musical, spatial/visual, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist types of intelligence (Gardner, 1999; Woolfolk, 2005). The instructional activities are expected to respond to the students with this array of diverse intelligence.

Styles of learning. The learning style is the learning behavior of the student. This concept was developed to describe the individual differences in ways of learning (Kolb & Kolb, 2005). The theory of learning styles indicates that every student has established his/her way of learning with which they feel convenient to work. Generally, the learning style builds up without awareness of the way being acted and conditioned. As stated by Dunn (1984), in the learning context, learners use different learning styles that they have possessed in them. That is, each person absorbs, retains, and processes information and/ or skills which is dramatically different for each person. Similarly, Armstrong et al. (2012) claim that learning styles are individuals' preferred ways of cognitive and behavioral responses to learning tasks. Learning styles can be changed and influenced by external stimuli. Exploring the learning styles of students is an ongoing phenomenon in the field of educational psychology. To address the diverse learning styles, Sadler-Smith (1996) presents a comprehensive approach, as a personal style blanketed by the term "learning styles" recognized as a holistic approach, which incorporates the learning preferences/instructional preferences, learning styles/information processing and cognitive styles/cognitive personality elements (Curry, 1983, April). In the onion structure of the style framed by Curry (1983, April), the learning style or information processing lies in between learning preferences and cognitive style. In this onion layered of styles, cognitive

personality elements or cognitive style is at the center and instructional preference or learning preferences is the outermost layer. This implies that the students are with dependent, independent, collaborative, impulsive, reflective, surface, and deep styles of learning which concern all three layers.

Socio-cultural theory. This theory posits that the human mind is formed within the context of a socio-cultural setting. Psychologically, the development of children is in the process of internalization of the external socio-cultural milieus. In the process of development, children proceed from perception memory, which is formed through the direct contact with the external stimuli, to the operation of memory incorporating and using artificial stimuli, which are signs or symbolic representations of stimuli. As posited by Vygotsky (1978), the symbolic operation leads humans to a specific structure of behavior that breaks away from biological development and creates new forms of culturally-based psychological process. He further claims that higher psychological function or higher behavior refers to the combination of tools and signs in psychological activity. The tool, as a means or instrument to communicate, and the sign, as a symbolic representation of anything, are socio-culturally constructed concepts to solve the psychological problem. This theory informs that the classroom is the context of teacher and student, where instructional operation of signs and tools are the means to transform an interpersonal process into an intrapersonal transformation through a long process of reconstruction externally and then internally (Vygotsky, 1978). The early stage of student life is in the process of incomplete and symbol processing (Hermans, 2002) towards development. However, a school might emphasize the signs and tools differently from society and family. Vygotsky (1978), claims that classroom learning is systematic which introduces something fundamentally new to the development of the child. They differ not only in the

physical environment and the people with whom the child interacts, but also in activities, expectations, rules, conduct, and ways of learning (Myers, 1992). In this context, the mode of classroom practice has a significant role in the knowledge construction using academic and formal signs and language tools which is a part of the development of a child.

“Iceberg Tip” theory. This theory suggests that human behavior is too vast to understand and deal with. It spreads from informal and unconscious learning to formal and conscious learning. The teacher’s and students' behaviors in the classroom instructional context are an overt, formal, and conscious practice that represents a very limited portion of human learning and behavior. Another huge sphere of behavior is informally, unconsciously, and spontaneously learned behavior which is learned from everyday life experience (Rogers, 2014). As claimed by Livingstone (2002), informal learning is like an iceberg mostly invisible on the surface and immense. Rogers further argues that it includes all the unconscious influences on a person through own family and groups within the wider society consisting of religious and cultural practice and peer pressures and habits (Rogers, 2014). This implies understanding the classroom behavior is implicitly influenced by the informal world, views, and practices.

Informal learning has a significant role to play in a person’s learning in a formal setting. Learning is wider than formal classroom education. Rogers also reemphasizes that informal learning is the iceberg base that has an impact on formal and informal learning. "All education is learning; but not all learning is education, education is processed, i.e., planned learning. Learning is much wider than education" (Rogers, 2014, p. 12). In the classroom context, formal learning occurs for formal knowledge within the formal curriculum which serves the formal political interests of

those with the power to decide the learning of the school children. This situation is always countered by the teacher's informally learned knowledge and behavior. Hence, informally learned behavior is much wider, natural, and living than formally learned behavior. This provides the understanding the classroom behavior as the interplay of formal and informal forces of a person and settings.

Discourse of pedagogical theories for change. Classroom pedagogical theories deal with the ways, methods, and techniques of instruction scientifically validating the practices of teacher and student's relation, position, and influences and artistically developing practices. In this sense, Alexander (2008) notes that pedagogy is considered both an act and a discourse. The act has been often dealt with as an instruction or teaching in a classroom context. This section deals with pedagogical theories as a discourse that implies changes in policy formation of instruction and its classroom practice. Pedagogical discourse is one of the discourses in the sphere of the academic community. The central concern of the pedagogical discourse is to enhance student learning where human interaction is at the crux.

In the theoretical context of the complexity, pedagogies developed for the classroom have distinct stands to respond to the problem of classroom human behavior. Child-centered pedagogical theories are a boon of Rousseau's philosophy of education. As the dominant pedagogical discourse in the academic arena, Rousseau's idea of child-centered pedagogy was further developed by Dewey (1986) as progressive pedagogy, by Freire (1993) as critical pedagogy, by Vygotsky (1978) as constructivist pedagogy, and by Kumaravadivelu (2001) as post-method pedagogy. These pedagogies connect the social, political, psychological, and philosophical stands with the child-centered classroom pedagogical problems.

The progressive theory underscores the role of the learner's experiences gained through interaction with the environment (Dewey, 1986). Moreover, Dewey argued that the role of the educator would be expected to maintain the continuity of the experience possessed by the learner in the interactive classroom environment. The continuity and interaction principles are longitudinal and lateral aspects of experience respectively. Social control over the experience is the macro process which lies beyond the classroom, but influences deeply the classroom interaction situation.

Opposing the traditional “banking” concept of educating, Freire (1993) emphasizes the teacher-student dialogical engagement enacted through a horizontal relationship for not just learning but also for knowing. Moreover, he states that through the dialogue, the teacher-of-the-students and the students-of-the-teacher cease to exist and a new term emerges: teacher-student with students-teachers (Freire, 1993) in terms of learning. Through the action and reflection of the pedagogical praxis, a new interactive relation between teacher and student emerges as a transformation ensuring the emancipation of the students. Hence, pedagogical practice is human activity that consists of action and reflection, also called praxis, and theory and practice.

Scaffolding theory. Scaffolding is the process of facilitating interaction to promote the student’s learning. The teacher's role in the scaffolding process is to make the student able to solve academic problems, handle learning tasks that are beyond his initial capacity, and move toward successful academic learning (Wood et al., 1976), for which a teacher is recognized as a service provider, model, guide facilitator for student’s learning mastery (Bruner, 1983). The knowledge co-construction takes place through the interaction between an adult and a child or teacher and a student (Vygotsky, 1930). The effectiveness of scaffolding within a

zone of proximal development is determined by the effort of interacting participants, i.e., teacher and student, at the micro level and is affected by the dynamics at the macro level. The scaffolding takes place through classroom interaction which is considered a curriculum enactment process. In the interaction, they process the content knowledge from the official curriculum, employing the student's prior knowledge to attain new knowledge through an interactional process of scaffolding (Hammond & Gibbons, 2005). Hence, the student's knowledge is upgraded through the scaffolding process by facilitating the learners considering their unique personal, academic, social, and psychological contexts in which the development of knowledge and skill proceeds.

Vygotsky argues that learning and development are interactive and interdependent processes. Learning is a spontaneous and non-spontaneous acquisition of concepts. It is the process of knowledge construction at individual levels with the help of the more knowledgeable other (MKO). The MKO hints at those persons who facilitate learners within his/her zone of proximal development (ZPD) (Vygotsky, 1978). He defines ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). The pedagogical role of a teacher in the classroom is to help a child having non-spontaneous, scientific, or academic learning in advanced development which is ZPD.

Post-method pedagogical theory. Post-method pedagogical theory, developed by Kumaravadivelu (2001) for teaching English as a second language teaching is equally applicable in the field of general classroom pedagogy. The theory emphasizes both teacher and student autonomy in teaching-learning activities and instructional

decision-making. It presents three parameters of pedagogy: pedagogy of particularity, pedagogy of practicality, and pedagogy of possibility which are interwoven and interactive endeavors for a synergetic functional whole (Kumaravadivelu, 2001, 2006). As claimed by Kumaravadivelu, the particularity parameter informs pedagogy which "must be sensitive to a particular group of teachers teaching a particular group of learners pursuing a particular set of goals within a particular institutional context embedded in a particular socio-cultural milieu" (Kumaravadivelu, 2001, p. 538). It merges into the practicality parameter. The practicality parameter concerns the relationship between the theory and practice of pedagogy. In this matter, he further states that the theory of practice developed by an expert is less practicable than the theory developed by the teacher as a personal theory through action and reflection, action research, insight, and sense-making. As argued by Kumaravadivelu (2006) the practicality parameter again becomes an integral aspect of the possibility parameter. The possibility parameter relates classroom pedagogy with the ground of the teacher and student's sociocultural, political, and historical backgrounds which have sufficient influence on their subjectivity, identity, and activity and create position and power. Kumaravadivelu (2006) further writes,

The experiences participants bring to the pedagogical setting are shaped, not just by what they experience in the classroom, but also by the broader social, economic, and political environment in which they grow up. These experiences have the potential to alter classroom aims and activities in ways unintended and unexpected by policy planners, curriculum designers or textbook producers. (p. 174)

Hence, these three parameters of pedagogy help to understand classroom pedagogical practice, teacher and student interaction, and influences. He further

argues that classroom pedagogical practices adopted by the teacher are micro-strategies reflecting macro-strategies of broad guidelines for instruction that are presented in a framework that informs teachers to work with alternative and multiple strategies rather than with predetermined and single strategies (Kumaravadivelu, 2006). This implies that the classroom pedagogical behavior of the teacher might be different from what the theory, policy, or plan has assumed to be at the macro strategic level when practicality, possibility, and particularity of pedagogies come into consideration.

Ecological systems theory. Outside of the classroom and school, there are systems that have constant interaction with the school classroom. (Vanderstraenten, 2001). Classroom behavior, interaction, and dynamism are interwoven with the dynamics occurring in and beyond the classroom. The classroom is a nanosystem that has interacting, interrelating, or interdependent systems dynamics creating a complex whole. The complex interacting reality of it is perceived by the actors and which lets classroom behaviors or activities emerge.

In the ecological system of education, the activities, interpersonal relations, and roles of teacher and student prevail as elements of the microsystem (Bronfenbrenner, 1979; Shelton, 2018). According to them, the elements of the microsystem are performing actions and processes, participating in activities as dyadic, and occupying a particular position. The role is a set of activities. Hence, the microsystem of instructional interaction is the verbal and nonverbal behavior between teachers and students in a classroom representing their positions.

From ecological theory, the teacher and student interaction activities, relations, and roles at the micro level are influenced by school systems and beyond. Though there are meso-, exo-, and supra systems, the macro system matters more. The macro

system depicts a blueprint of the abstract interacting systems like culture, belief systems, bodies of knowledge, material resources, customs, lifestyles, opportunity structures, and life course options within broader systems (Bronfenbrenner, 1994) which are distant but ultimate ends of the classroom activities. Stating more explicitly, the macro system encompasses ideologies, institutional structures, politico-socio-economic policies, and public policy which exist as formal intent and general implication. Pedagogically, the intent discourse, material, and social dynamics are external forces to classroom actions and interactions that require to keep interaction consistently. The natures of the dynamic elements in classroom interaction remain an immediate or distant, obvious or hidden, and direct or indirect influence (Burns & Knox, 2011) likewise formal and informal as well.

According to Fleischer (2001), the dynamic influence from one end does not exist in the ecological system which is a new shift and alignment. It ignores the either-or- perspective, i. e., from macro to microsystem and micro to macrosystem; rather macro and micro two-way akin interaction systems. The micro scaffolding occurring in the classroom recaps, questions, conforms, rejects, elaborates, and reformulates the content knowledge prepared by the macro system. Similarly, macro-level scaffolding involves teacher training programs, curriculum plans, educational programs, and formulation goals. Hence, in terms of learning through curriculum, there is a two-way interaction and there is a contingent relationship between micro scaffolding and macro scaffoldings (Engin, 2014; Hammond & Gibbons, 2005). The two-way interaction generates teachers' meta-behavior aligned with meta-cognition which controls, regulates, and monitors their own behavior. Hence, the teaching activity of a teacher in a classroom is acting meta-cognitively which involves teaching with and for meta-cognition (Hartman, 2001). In this way, meta-cognition has an important role

in verbal communication, persuasion, comprehension of information, self-control and instruction, and cognitive behavior modification (Flavell, 1979). Hence, there is an interaction between cognition, meta-cognition, and meta-behavior within a teacher during behavioral processing in classroom teaching. The classroom interactional behavior of teacher and student is a systemic process influenced by the micro-, meso-, exo-, and macro-systems. The classroom behavior of teacher and student is influenced by the layered systems and nonhierarchical systems functioning outside the setting. The acts of the systems imply that the teacher and student's behavior in the instructional context is not simple and linear. Rather it is a complex, dynamic, and emerging process.

In conclusion, multiple theories have been reviewed to theoretically understand the classroom behavior of teachers and students in instructional activities from a holistic perspective. The theories eclectically employed for this study have provided an explicit theoretical ground to understand the complexity of classroom human activities. The review implies that teachers and students are with complex human endeavors whose classroom activities are affected by the interplay of their intrinsic and extrinsic dynamics to the behavioral dynamism. Intrinsically teachers and students are inherently psychological and philosophical beings with self, mind, and identity. Both of them are theoretically assumed to be in the process of being-becoming-being caused by the purposeful educational, professional, and discursive interventions and contexts which are regarded as extrinsic dynamics to teacher and student behavior, for causing a change in the classroom activities. Furthermore, the extrinsic dynamics are associated with the human ecological systems. The theories inform and enable this researcher to cover and explore situated intersections of the students' development, individual differences, and socio-culture background with the

teacher's classroom instructional behavior treated through formal, official, and purposeful professional knowledge system encompassing the discourses of pedagogies for classroom transformational dynamism.

Policy Dynamics of Classroom Dynamism

The policy is publicly recognized principles, rules, and regulations that concern information or directives for a system or human behavior in general. For Jones (2013), the policy takes the form of a text, values-laden action, a process, and a discourse that imply different understandings for policy formulation and practice in international and national spheres. He further argues that the policy formulation and practices depend on the agencies working at international and national levels aligning with the belief in the conservative, liberal, critical, or post-modern paradigmatic orientation. The pedagogical assumption of these orientations, as argued by Jones, is understood as authoritative knowledge transmission; as facilitated by a teacher and inquiring by students; as questioning authoritative knowledge, and power and liberating students; or as constructing knowledge, and multiplicity values; respectively (Jones, 2013). Viewed from this policy synchronization, the formal classroom instruction policies and practices are explicitly concerned with the national education policies that are formulated by a state and are also closely connected with the global education policy context.

Global policy dynamics to classroom dynamism. The globalization phenomenon, developed after criticizing colonization and westernization global tendencies, emphasizes universalization and standardization of policy matters which becomes a potential dynamic of a national education policy and classroom practice (Sahlberg, 2004). Sahlberg claims that policy globalization of teaching and learning focuses on three aspects of education: a globally unified agenda for educational

development, standardized teaching and learning as vehicles to improve quality, and emphasis on competition among individuals and schools.

The concern in the present study is teaching-learning rather than educational development and competition between schools and individuals. However, modes of teaching-learning remain at the core of the two. As a consequence of policy globalization in education, learning standards for students and teaching standards for teachers have emerged for quality improvement (Sahlberg, 2004). As stressed by Williams (2015), the quality improvement from the international education policy signifies increased teacher professionalism along with changes in teacher behavior and teacher-student interactions. The educational policy agendas announced by the international educational conferences and agencies emphasize reforming the educational scenario of different countries, particularly those of developing countries which has inevitable implications for instructional transformation. For instance, (Williams et al., 2015) argue that an inclusive international policy agenda implies the focus on instruction shifting from teacher-centered to child-centered which encourages the students to come up to interact with the teacher.

Stressing the interactive position of global, national, and local forces, Williams states that international education policy must be understood either as an aggregate of national policies derived from the influences of global, international, and transnational forces and indigenous, local, and national forces explicitly; or as tacit or implicit policy (Williams, 2015). This implies that a national education policy emerges from an interaction of the global and local forces where the participation of teacher and student in the instructional situation is at the heart. He further claims that the survival of formal international education policies depends on the initiation of governments to adopt them in their policy, and then practice (Williams, 2015).

Explaining the educational and instructional policy context of Nepal, the CDC (2007) takes into account the impact of globalization and commits to a knowledge-based society on the formulation of educational policy as well as the various aspects of the curriculum including teaching-learning activities.

Anderson-Levitt (2003) maintains that the pedagogical reform emphasized by international education policies reveals contrasting positions. Contrastingly, on the one hand, the global agenda orients teacher autonomy, learner-centered, student participation, active learning, hands-on, and student autonomy; simultaneously, on the other hand, orients controlling the teacher, de-professionalization, content-centered instruction, and core knowledge of teacher development. These diversified orientations of global agendas inevitably influence national policy as well as classroom practice. These contrasting positions are interwoven with global, national, and local policy issues. Similarly, the CDC (2007) also hints at a challenge to maintain a balance of the local, national, and global policy requirements which directly affects the selection and practice of classroom teaching learning strategies. The CDC (2019) re-emphasizes the global policies to adapt with careful and critical analysis of the national needs corresponding with international practices and commitments.

National policy dynamics to classroom instruction. In practice, formal classroom teaching emerged along with the advent of the modern school education system in Nepal, though there was no publicly formal policy till the report presented by the NNEPC, the first commission on education at the national level. The substantive essence of the NNEPC was to ensure education and classroom instruction based on progressive philosophy. The commission envisioned education “as guided experiences in living. Children should not be forced to step into ‘another world’ as

they cross the threshold of the school" (NNEPC, 1956, p. 98). It further stated that school children's learning becomes effective, rapid, and permanent when they take active participation in the learning process. It also suggests that dynamic, active, self-directed behavior helps to develop responsible attributes and leadership in the students.

Methods of teaching, in a broad sense, refer to the function of the teacher concerning the curriculum (NNEPC, 1956), but till the initiation of the NESP, the curriculum document was not in existence. Instead of it, teachers' relationship was with a textbook for the teaching (CDC, 2003). The then-teaching methods were criticized as being old-fashioned (MOE, 1971). In the plan, it has been mentioned that innovative and evolving teaching methods based on research would be used in teaching different subject areas. The report of NEC (1992) recommended a new dimension for education policy and classroom instruction to respond to the socio-cultural and linguistic diversity of the students to make teaching pupil-centered; that is said to be methodological diversity of education.

The national education policy states to improve physical and educational infrastructure, teaching-learning process, and learning environment at the secondary level education system (Ministry of Education, Science and Technology [MOEST], 2019). The policy further writes that the school teacher service commission would be improved for recruitment of those people who are found interested, motivated, and qualified for the teaching profession and for converting the existing teacher training centers into instructional academies (MOEST, 2019). In the same policy line, the NCF has provided concrete curriculum policy that attempts to bridge the nation's educational aspirations and recommendations of commissions with specific curriculum and curriculum materials. It sets out broad and flexible principles for

curriculums, syllabi, and pedagogy to practice in classroom teaching. The framework emphasizes making teaching-learning activities research-oriented, interactive, and promotional. Similarly, activities like project work, case studies, and observation are to be emphasized in the process of teaching-learning (CDC, 2007). Belonging to the NCF (CDC, 2007; Curriculum Development Center, 2019) guidelines, the basic and secondary school education discipline-led subject design curriculum plan, syllabus, and teachers' guides are developed. These forms of written curriculum contain subject-wise and lesson-wise specific teaching-learning strategies to be carried out in the classroom.

The science subject curriculum for Grade 9 specifies lecture method, demonstration method, experimental method, question-answer method, discussion method, field study, project work, and satellite method to facilitate students' learning to translate the intended methods into instructional behavior in the classroom contexts. Similarly, the social studies subject curriculum of the grade recommends instructional methods like a lecture, question-answer, demonstration, problem solving, discussion, observation, discovery, role play, project, experimental, field trip, inductive, case study, critical thinking, etc. to facilitate students in classroom learning (CDC, 2014). The teacher's guides (TGs) for these two subjects have closely given guidelines for classroom instructional activities. The intended activities are expected to be executed by teachers in classroom instruction.

Transforming policy of teacher development in Nepal. The formal school education system of Nepal, as stated by Caddell (2007), a "western-style education" and a "formal tutor-led instruction" (p.254), has crossed its one-and-a-half-century long historical course, adapting to and naturalizing with the global modern or mainstream education system. However, teacher education has only seven decades-

long historical passage set up for teacher professionalism in Nepal. A landmark change in teacher education was made by the recommendation of the NNEPC. As the recommendation made by the commission, Normal Schools and Colleges of Education were established for teacher education (NNEPC, 1956). Historically, the teacher education program reveals distinct changes in terms of the nature of programs and institutions. It has been taken as the heart of the formal school education system for formal instruction.

Teacher education was formally initiated by establishing the Basic Education Training Center (BETC) under the MOE but it worked for only three years (NNEPC, 1956). BETC was re-activated after a few years in the form of a Normal School which started to train the in-service teachers and teacher candidates for three and six months (Wood, 1965). It was limited only to teacher training programs. Another step taken in teacher education was the establishment of the College of Education which is regarded as the second phase. The functions of the college were:

To prepare secondary school teachers, administrators, supervisors, normal school staff; and other educational personnel as needed; to provide workshops and other classes for in-service training; to supervise the Normal School program; to encourage and supervise educational research; to direct preparation and publication of textbooks and other teaching aids; to establish and operate demonstration primary and secondary schools; to develop an adult literacy program; and to provide other educational services and leadership as needed. (Wood, 1965, p. 57)

Along with the establishment of Tribhuvan University as the first university in Nepal, the institution of teacher education also entered into the third phase of its development, transforming into the Faculty of Education under the university. The

Faculty of Education had the responsibility to run the colleges of education and teacher training during the initial period. The main function of the Faculty of Education, since its formation, is to prepare academically as well as professionally qualified and trained teachers, and other human resources in the field of education. It offered a 2-year program for an Intermediate Education (IEd) certificate, an additional 2-years for a Bachelor of Education (BEd) degree, 1-year BEd, and 2-year Master of Education (MEd) blending the liberal arts and professional areas of contents (Wood, 1965). It seems that the quality of teacher education has been focused on for the last four decades. Tribhuvan University, Faculty of Education (FOE) prepares competent teachers for school education through its academic as well as professional programs (Faculty of Education [FOE], 2015). To build up knowledge and skill bases for prospective professional teachers, it offers courses to develop communication skills in English and Nepali language; professional knowledge of philosophy, sociology, educational psychology, and curriculum and evaluation; specialized knowledge of subject matter and pedagogy; and content pedagogical skill through practicum/internship (FOE, 2015). The contents of curricula of the pre-service teacher education programs; and the structure of the course of study within the program consist of objectives, content, teaching-learning strategies, evaluation procedures, and a list of references; which are comparable with similar regional and international programs (Pillay et al., 2017). This informs that the aspects of teacher development education programs in Nepal are internationally recognized.

As the educational initiatives of this period, the NESP and NEC have emphasized quality teacher education. In the NESP, it has been mentioned that the problems in the teacher training program were to increase the number of trained teachers and to improve the quality standards of training (MOE, 1971). Moreover,

NEC states that, for a good teacher, just knowledge and experience on the subject matter are not sufficient. Therefore, teacher training was considered an obligatory provision to increase teachers' professional quality, acquire basic pedagogical knowledge and skills, and gain tutorial efficiency (NEC,1992). The teacher education approach has shifted from teacher training to a teacher professional development approach in the last two decades intending to connect teacher education with teachers' everyday classroom life. In the words of Villegas-Reimers, it is "the transformation from teacher *training* to teacher *professional development*" (Villegas-Reimers, 2003, p. 36). She further argues that professional development refers to the development of a person in his or her professional role (Villegas-Reimers, 2003). The policy effort and changing teacher development approach at the macro level are expected to make influence on the teacher's instructional behavior.

The NCED, currently merged into CEHRD, was the main institution established for teacher training and professional development. The policy guideline states that all teachers working in government-aided schools would be provided access to a one-month Teacher Professional Development (TPD) course by 2015. It further states that continuous professional development (CPD) opportunities would be introduced to all teachers (NCED, 2010). The continuous teacher development policy emphasizes the teacher's agency to change or transform his professionalism.

Theoretically, TPD is considered a new image of teacher learning, a new model of teacher education, and a new paradigm of professional development that contains formal as well as informal experiences (Villegas-Reimers, 2003), long-term process, actual classroom experience, constructive process, teacher empowerment, reflective practice, and collaborative process (Darling-Hammond & McLaughlin, 2011; Villegas-Reimers, 2003). Furthermore, Wood and McQuarrie argue that on-the-

job learning activities like study groups, action research, and portfolios are considered the most successful teacher development (Villegas-Reimers, 2003). An innovative demand-based TPD policy introduced by Nepal encourages the teacher to carry out school-based action research (Pillay et al., 2017); which has claimed that just attending conventional and one-size-fits-all training programs would be broken up (NCED, 2010). The policy emphasizes that the TPD needs to be understood and internalized at the level of the system, organization, and individual teacher to address immediate pedagogical problems of the teachers and engage them in learning opportunities for continuous professional development. If it is viewed from Schon's perspective, it emphasizes knowing-in-action and reflection-in-action in the professional context of the teacher (Schon, 2016). Similarly, Guskey's model suggests that changes occur in teachers' classroom practices, student learning outcomes, and teachers' beliefs and attitudes in a sequential and contingent manner (Guskey, 2002). This model has been supported by several empirical research findings. The teacher's beliefs and attitudes towards a teacher development program depend upon the change caused by students' learning outcomes that are caused by the changed classroom practice through the program.

In conclusion, the national policy of education is found to be deeply influenced by the philosophies, theories, and trends preferably talked about in international education forums. The classroom pedagogical approach is the central issue being dealt with in the reports of the national level education commissions and committees, policies, and plans since the last seven decades of Nepal's educational history. The policy literature reveals a high emphasis on students' participation in classroom and child-centered pedagogies with the intention of reducing the teacher-dominated instructional situation. The teacher development policies and programs of

different times reflect transformation at the level of intent. The review implies exploring the role of policy dynamics in classroom practice and transformational dynamism in terms of teacher and student behavior in the classroom context. More specifically, the review of policy pedagogical directives oriented this research study to draw the meaning of policy interventions in instructional behavior through observing the policy-intended pedagogy in classroom practices and eliciting lived policy experiences of the teachers in their professional lives situated in the complex classroom systemic context. This tells us to discuss and interpret the classroom behavior intersecting with policy provisions.

Previous Research Studies

Classroom research in recent years is a widely expanding field in education that has advanced pedagogical policy, theories, and knowledge that shape classroom practices. During the NESP (1971-1976) education era, classroom instructional behavior research using systematic observation techniques at the school level in Nepal emerged. The education system plan stimulated systematic classroom study as it intended to conduct projects for the improvement of classroom teaching through research on and use of scientific teaching techniques (MOE, 1971; Pfau, 1977). At the same time, CERID was established to conduct research systematically in the field of education. Hence, the following empirical literature concentrates on the classroom studies conducted since the NESP. It discusses the empirical literature with the delimitation, process, and findings of the research conducted in Nepal which have provided ground for this research creating a research position. The empirical literature available is thematically reviewed in this section.

Classroom behaviors in developing and developed countries. Research on classroom interaction has been in practice for the last nine decades but its extensive

practice with a qualitative approach to understanding teaching, learning, and classroom interaction has been six decades in developed countries (Skukauskaite et al., 2015). The classroom interaction and behavior research in developing countries is too young compared to developed countries. The stages of educational development proposed by Beeby have been theoretical grounds for the researchers who intended to be involved in comparative educational research. Under the stages, according to him, the four stages of school systems are dome school, formalism, transition, and meaning (Beeby, 1966) which are regarded as qualitatively higher from one stage to another in terms of quality of teachers, characteristics of education, and distribution of teachers (Guthrie, 2011; Pfau, 1977). Pfau's cross-national comparative research was conducted on classroom behaviors from Nepal and the USA with behavioral categories of laboratory experiences, group projects, student demonstration, library research, field trips, student speaking, teacher questioning, workbook work, teacher demonstrations, lecture, and silence using ACI has showed significant difference.

Similarly, the research conducted by using the Flanders Interaction Analysis Categories (FIAC) technique on teacher and student interaction behaviors including accepting the feelings of students, praising and encouraging, accepting and using ideas of students, asking questions, lecturing, giving direction to students, criticizing or justifying authority, student talk-response, and student talk-initiation had also shown more student-centered in the classrooms of the USA than Nepal (Pfau, 1977, 1980). Referring to the research findings of Pfau, Guthrie states that Nepali teachers' classroom behavior is formalistic; whereas American teachers' behaviors are at meaning stage (Guthrie, 2011). The formalistic behaviors in Nepal and the meaning style of teachers' behaviors in the USA fall into the stages second and fourth respectively, in Beeby's developmental thesis.

After analyzing the classroom research reports from sampled developing countries: Nepal, Botswana, Namibia, and China, as cases of the study, Guthrie concluded that the instructional behaviors in the countries were widely formalistic classroom characterizing highly organized, symbols with limited meaning, rigid syllabi, emphasis on 3R's, rigid methods – 'one best way', one textbook, controlled by external examinations, inspection stressed, discipline tight and external, memorizing heavily stressed, emotional life largely ignored (Beeby, 1966; Guthrie, 2011; Pfau, 1977) although the official policy stresses progressive approach to teaching and learning. So far, formalism and progressivism are two different educational paradigms. Guthrie finds mismatches between policy and classroom practice; therefore, the policies and commitments of the government and the hypothesis of developed countries' experts do not reflect the classroom reality (Guthrie, 2011, 2018). Drawing on the study reports from developing countries including Nepal, Guthrie identifies six features of formalistic classroom practice that are:

- a) formalistic teachers do not necessarily rely just on lecturing; b) there can be variation among formalistic teachers; c) teachers and students can share the same expectations about the value of formalism; d) formalism can be perceived as hierarchical without being authoritarian; e) formalistic teaching can foster student engagement and high academic standards; and f) formalistic systems can be structured to give incentive to teachers to upgrade their skills.
- (Guthrie, 2011, pp. 30-31)

Similarly, Yan's (2008) study on Chinese secondary school classrooms found that teaching behavior is the dynamic characterization of the quality of teachers, external performance of the teaching idea, the application of knowledge,

and the teaching skills, and also the specific application of professional knowledge and teaching experiences of the teacher.

In this way, the behavior has several influential factors which include the teacher's educational ideas, professional knowledge, teaching skills, and teaching sense. It is an intermediary link between teaching practice and teaching theory. It is not only the application of teaching theory in practice but also the systematic and theoretical summation of the teaching experiences. Teachers play a crucial role in implementing designs and modes of teaching in different classroom situations. The main problems found through the study are teachers' poor tutoring behavior; weak demonstration for experiments; over-reliance on modern teaching multimedia; serious formalistic classroom teaching; and teacher's control in classroom discourse.

Classroom pedagogical transformation is a prioritized educational and research agenda in the Asia-Pacific region. Based on the research reports presented by researchers and educationists of this region, Law and Miura (2015) conclude that the governments and educators of the seven countries (Fiji, Indonesia, Japan, Kyrgyzstan, Nepal, the Republic of Korea, and Viet Nam) are committed to transforming school classroom teaching and learning to respond to the diverse needs within their countries.

The research findings lead this researcher to question the policy positions of international and national agencies and their influence on classroom behaviors, instructional practice, and the nature of classroom interaction. The findings also hint at the need for situated research to explore live classroom realities through systematic and intensive procedures. Nepal is a developing country working with international agencies on various agendas to transform classroom instructional behaviors for quality improvement of education. In this context, classroom researchers are

stimulated to conduct studies using Beeby's stages of education system development and relying on Pfau's research findings.

Diverse dimensions of classroom studies in Nepal. Going back to the historical events of education in Nepal, formal classroom pedagogical practice crossed one-and-a-half centuries; the research on it is still less than five decades old. In this course of time, several studies on classroom pedagogical practices have been conducted. The synopsis of the research reports and dissertations and their potential implications for my research are thematically discussed below.

Categories of classroom behaviors in instruction. Research and innovation in the classroom were one of the prioritized areas of NESP. As the plan intended research on scientific methods to improve classroom teaching, Pfau (1977) conducted research systematically using Flenders's FIAC for classroom verbal behaviors and Caldwell's ACI for non-verbal behaviors to contribute to the knowledge of the field of classroom behavior. The research on classroom behaviors was conducted to identify the classroom instructional behaviors of teachers and students in Nepal and to compare their instructional behavior categories with the behaviors of American teachers and students. The study was conducted in schools situated in central Nepal including Kathmandu Valley. The research was related to the four school subjects (science, mathematics, language arts, and social studies) of grades second, fifth, and ninth. In the systematic classroom observation made in Grade 9, Pfau (1977), using ACI, found individual practical activities (.0%), group work or project work (.0%), student reports and field trips (.0%), student demonstration and presentation (.0%), student speaking (6.6%), teacher questioning (7.0%), notebook work (.8%), demonstration, audio-visual (.8%), lecturing (81.3%), and silence or havoc (3.5%) in social studies; and laboratory experience (open) (.0%), laboratory experience

(structured) (.07%), group projects (1.03%), student demonstration (2.73%), student library research, reporting, and field trips (.0%), student speaking (7.36%), teacher questioning (3.20%), notebook (11.02%), demonstration and audio-visual (.91%), teacher lecturing (68.60%), and silence and havoc (5.08%) in science teaching behaviors or activities. Similarly, using FIAC, he identified accepting and using students' ideas, asking broad-response questions, and criticizing and justifying authority teaching behaviors were very rare. On the other hand, his research findings concerning both FIAC and ACI techniques showed that teachers' lecturing behavior in the classroom was of utmost dominance in all the subjects and classes.

The research findings of Pfau stimulate further comparative and in-depth study within Nepal to see whether classroom behaviors of teachers and students have changed, and what forces would have been involved in the changes; since many forces might have emerged to the classroom dynamism. To be specific, the research findings imply the present study in two ways. Firstly, the behavioral data of teachers and students yielded through the research of that time would be employed as baseline information to compare the present instructional behaviors for identifying whether changes have occurred or not during the span of educational development. Secondly, the identified status of classroom behavior would serve as a further lead for an intensive study to explore the roles of dynamics.

Impact of teacher training on instructional behavior. A landmark contribution of the NESP was the inclusion of teacher training as a compulsory criterion for classroom teaching. Since then, research on teacher training and its impact on classroom teaching has become a common research issue for classroom researchers in Nepal. Teacher training is one of the expected dynamics to change teachers' behavior. Realizing this assumption, the NCED and MOE researched the

transfer of teaching skills which showed that the teaching skills trained with teachers were found not transferred to the real classroom situation as at the intended level (CERID,2003). By using methods of training observation, classroom observation, and interaction with stakeholders, the study compared the consistency between the training skills specified in modules of the Department of Education(DOE), NCED, and Distance Education Centre (DEC) and the transfer of the training skills by the trained teachers in the process of classroom teaching. The study aimed to assess teacher training programs, the transfer of training skills by teachers, and factors affecting the transfer of teachers' training skills. The study reported several weakening and supporting factors in the transfer of training skills and categorized the interfering factors related to teachers, the training process, and curricular materials (CERID,2003). As found in the research, the teacher-related weakening factors are:

Teachers being skeptical about the newer techniques/methods, inability to give up old habits easily, lack of competency on the subject matter, lack of motivation, and indifference on their part were the reasons for the non-transfer of training skills that relate to the teachers. (CERID,2003, p. 20)

Transfer of training skills is to change the instructional behavior of a teacher. Along with the teacher-related factors, the weaknesses in training and curricular materials are also responsible for the non-transfer of training skills which ultimately helps the instructional behavior to set back to spontaneity. On the other hand, supporting factors of the transfer of training skills found in the research were practice-based and convincing training and up-to-date curriculum materials.

The teachers' instructional practices have been treated from a new paradigm named continuous teacher development. Relating to this training intervention, the research conducted on the topic of the Status of Teacher Education and Development

in Nepal drew out findings that the CPD has not effectively impacted teachers' instructional behavior (Borg & Vertex Consult, 2023). The research report further states that the potential of the federal education policy to enhance teacher CPD is not yet being realized.

To restate, teacher training is one of the dynamics to change the classroom instructional behaviors of teachers and students. The research findings have shown little or no impact of teacher training on classroom instructional practice. Therefore, my concern in this study is not on the linear impact of a single factor. Rather other multiple factors, called dynamics in this study, might have a vital and interactive role in strengthening or weakening the transfer of skills gained from teacher training programs. To this end, the research relied on instrumental and mechanical approaches and procedures.

Pedagogical transformation. Reflecting on the research findings, Law and Miura (2015) interpret the pedagogical transformation as moving from the conventional, teacher-centered transmission approach towards a learner-centered, participatory one, for which a global shift is taking place to change pedagogical practice. Nepal's education policies have long emphasized students' learning experiences (NNEPC, 1956) without using the term "transformation" signifying paradigm. Explicating the practice reality, the research of Singh (2015) reports that the past, present, and future pedagogical practices have contingent historicity where the pedagogical contexts and reform initiatives are at the core of making differences. In the last seven decades back, that was the era of NNEPC, efforts at the policy level have been made to eliminate teacher-dominated classroom pedagogy replacing it with child-centered teaching. It is a constantly underlined policy recommendation in the national-level documents of Nepal. The Seti Project intervention was the first and

milestone transformative effort made on the ground in Nepal's education (Robinson-Pant, 2023). Alongside rural development through education, numerous school reform initiatives have been implemented to change classroom situations by focusing on classroom teaching.

To respond to the impact of the pedagogical reform initiatives of the government and different agencies, CERID (2007) researched to explore the classroom changes brought about by government policy and efforts such as Child-Friendly Schools, Innovative Child-centered Teaching-learning Processes, Quality Education Resource Packages, Interactive Radio Instruction, and Innovative Forum for Community Development, and to identify the requirement of classroom transformation. The research conducted at primary schools using classroom observation and interaction with stakeholders yields two types of findings: instructional change and preparedness for transformation. As an instructional change, there was an improvement in teacher-student interaction, increased student participation, use of teaching materials, and use of the curriculum. As preparedness for transformation, the findings in the research were the development of shared vision, knowledge, and understanding, the use of incremental change processes, and the adoption of practice-based training.

Thakuri (2012), in his Ph.D. dissertation research on A Retrospect and Prospect Study on Pedagogical Practices at the Primary Schools in Nepal, studied the purposes of exploring pedagogical practices in retrospect, to analyze the intended pedagogical approaches comparing them with their actual practices, and proposed measures for pedagogical improvement at the primary level in Nepal. In this descriptive study, he attempted to explore the classroom pedagogical practices that prevailed from the Primary Education Project (PEP) to the date of his field study as a

retrospective study covering twenty-five years of policy and practices using interviews, classroom observation, interaction, and desk study techniques. Reviewing the study reports, he found the subsequent projects and programs emphasized the improvement of physical infrastructure, curriculum development, medium of instruction, instructional materials, classroom pedagogy, and assessment practices of which the ultimate intention was to provide quality teaching and learning for quality education (Thakuri, 2012). In this regard, his review of the study reported "Classroom practices mainly found classroom delivery teacher dominated and emphasis on rote learning. Teacher lecturing, paraphrasing, drilling, reading, and repeating from the textbook, memorizing question/answer were dominant approaches" (Thakuri, 2012, p. 92). In the study, from live classroom observation of forty-eight classrooms of the twenty-four sample schools, the researcher found row and column style of seat arrangement in 83% of classrooms, 'T' shape seat arrangement in 78%, and space for easy movement during a teaching in 19% classrooms. Similarly, to identify teaching methods used by teachers, one hundred forty-four class lessons were observed by the researcher. Among them, teacher's lecturing in 82%, reading and paraphrasing in 42%, question-answering in 2%, discussion in 2%, demonstration in 1%, and role play in 1% of class lessons were found which reveal that students have been given too limited opportunity to be involved in classroom interaction and activities. Thakuri (2012) further writes that lecturing or paraphrasing followed by questions and answers in the whole class were the dominant approaches.

Since the NESP, Seti Project, Primary Education Project (PEP), Basic and Primary Education Project (BPEP)-I and II, Education for All (EFA), School Sector Reform Plan (SSRP), and School Sector Development Plan (SSDP) have made a series of efforts to transform school education where classroom pedagogical change

has remained at the core. For these plans, projects, and programs, various national and international agencies and experts are found constantly working strategically for transformation. The agencies themselves and educationists and researchers are found hardly convinced by the transformation in classroom pedagogical practice to the extent. Critically reflecting on the reviews on studies of agenda-led reform initiatives, Thakuri concludes that:

Intention and commitment to 'quality primary education' are being reiterated from one project/program to another in Nepal. There is progressive refinement in defining and linking quality education to children's learning. The findings of the studies on the practices in Nepalese classrooms are not so encouraging. There is still a long way to have improved classroom practices (Thakuri, 2012, p. 92)

The excerpt informs the need for an intensive study in this respect. Further, the dissertation of Thakuri (2012) implies that the reform agendas and initiatives of the different projects and programs, as well as the historicity of pedagogical initiatives and practices and prospects become the dynamics to be studied to understand classroom dynamism, particularly impacts on the instructional behaviors. Furthermore, it provides data from the past to compare with a present behavioral account of the classroom instructional behavior.

Classroom discourse. The PhD dissertation research of Dhakal (2014), studied the issue of classroom discourse in Nepalese schools from a cultural perspective to understand classroom discourse practice and the influence of classroom culture on the classroom discourse. This study explored various dimensions of classroom discourse behaviors of teachers and students participating in the discourse of social studies, mathematics, and English subject classes. Eliciting information through classroom

observation and interaction with head teachers, teachers, and students of grades 8th, 9th, and 10th from the community and institutional schools of Kathmandu Valley, the researcher analyzed the information using an analysis framework that consists of layered benchmarks such as classroom discourse, preparation, introduction, elaboration, interaction, recapitulation, school environment, and culture or society, from core to outward (Dhakal, 2014). Among the benchmarks, preparatory, introductory, elaborative, interactive, and recapitulation were taken as classroom discourse indicators to be covered in the process of information collection of the discourse. The common discourses found in the three subject classes suggest that teaching strategies were carried out by teachers without any lesson plan, and the focus of teaching and learning activities was on the examinations to secure a high score. On the other hand, some subject-specific patterns of teaching and discourse activities found by the researcher inform cultural perceptions of teacher and student during the interaction on the matters of social studies, valued to the textbook, not to the students' perspectives in Mathematics teaching, and students not being participated in dialogues, interaction, and communication in English class.

Analyzing the classroom discourse from a cultural perspective, the study reported that the classroom culture observed in the schools had no relation with the discourse observed in classes or vice versa. The research findings; furthermore, substantiate the reality that the tie between the cultural factors and the discourse factors was very rare in the observed classes. Hence, the research findings imply that cultural context is a dynamic of classroom behaviors. However, the culture in the classroom is not everything that shapes the teacher and students' interaction and discourse. There might be other various forces to influence the teacher and students'

teaching and learning behavior, as it is an "official classroom" Cazden (2001, p. 54) interwoven into the complex context of the systems.

The empirical literature review reveals that, firstly, the research on classroom pedagogical practices so far is synchronic in their focus on time, context, and practice. Secondly, the studies are cross-sectional and cross-national which have not informed about pedagogical practice occurring changes in the vertical course of time as a change in the school contexts. Thirdly, the research studies have focused on discrete, linear, cause and effect, and mechanical impacts of training and intervention programs which excluded human perceptions and experiences in the classroom. Fourthly, the question 'why do any instructional activities occur?' has not been studied in-depth and holistic manner. Fifthly, the status of classroom teaching-learning that happened at that time has been explored, but the research is found not concentrated on exploring comparative differences of instructional behaviors or activities of the past and present. These manifest the research gap that exists in classroom instructional pedagogy. To fill the gap, my research effort takes place to identify the state of dynamism of teachers' instructional behavior and the role of dynamic forces in it, as mentioned in the research objectives and questions.

Literature Review-Informed Frameworks

The theoretical literature review implies seeing classroom interaction and behavior as complex phenomena understanding from multiple theoretical grounds. Philosophical, psychological, pedagogical, and sociocultural theories provide lenses for interpreting teacher, student, and their classroom behaviors. Moreover, educational policies, theories of power, and systemic mechanisms are acknowledged for this study to understand teachers' and students' perceived everyday formal classroom life. The research approaches and findings reviewed so far have focused on

teacher development policies, programs, and training and their linear and mechanical effect on classroom instructional behavior. Again, the review reveals the discrete and reductive process of research which has shown that teacher education and training initiatives have failed to transform the classroom teaching and learning process (Pillay et al., 2017). A crucial question that remains to be explored is whether the teacher-related policy, program, training, and discourse initiatives have transformed the teacher's self, mind, identity, and belief before transforming classroom teaching and learning. Similarly, whether the everyday lives of teachers and students and the vast informal world can be discarded from formal classroom activities might have a significant space in the study.

Lastly, the teacher's and student's behavior is tied to the classroom instructional system that is bounded and interacts with layered ecological systems. This portrays the complexity of multiple dynamics to understand the classroom behavioral change of teachers and students. The researchers have ignored the complexity of the classroom instructional activities caused by the interplay of multiple forces. The argument of Burns and Knox (2011) has been well supported by the conclusion of this literature review that linear, categorical descriptions of classroom processes and interactions alone do not sufficiently explain the complex nature of classroom activities, and cannot account for how classroom change occurs or does not occur, over time. It requires a complexity-responding explanation. Hence, it implies inviting a new theoretical framework to respond to the multiple dynamics, not a single, and their interplay in a single study to explore and make meaning of dynamics to the dynamism of teacher and student's classroom behavior.

Complex dynamic systems. The present study adopted complex dynamic systems as a theoretical lens or framework to deal with the classroom behavior

situating it in complex, systemic, and dynamic contexts. De Bot (2017) advanced the complex dynamic systems theory (CDST) integrating both complexity theory and dynamic system theory into one general theoretical framework. Larsen-Freeman (2015) “Change and emergence are central to any understanding of complex dynamic systems” (p. 11). She further argues that dynamism is a theoretical concept that makes the study change central; and the word emergence informs the spontaneous occurrence of something new (Larsen-Freeman, 2015). Dynamism and emergence processes are caused by the associated dynamics that have interactive relations leading to unpredictable consequences. For Larsen-Freeman (2015), CDST is characterized as change that refers to a theory of process and becoming; space that signifies emerging patterns; the relationship is to understand the interdependent relationship among the involved factors; nonlinearity refers to lack of linear relationship between cause and effect; exhibition of sensitive dependence on initial conditions; non-finality refers to continue evolving without certainty of an end; adaptation informs to behavioral change as an ever-changing environment; context-dependent is to understand learner and learning environment as interdependent dimensions; and at last, non-Gaussian distributions tells that the computing average behavior cannot inform much about the behavior of the individual components or agents of the complex system. Similarly, Patton (2015) has also argued that complex dynamic systems are dynamic, unpredictable, ever-changing, and adapting. In this theoretical context, the classroom behavior of teachers and students is a phenomenon woven into the complex dynamic nature of the systems.

The theories invited to the complex dynamic systems have contrasting positions and commonalities which help the phenomenal understanding to reach into a deep, intensive, comprehensive, holistic, and pragmatic sense. That is, as mentioned

by Mason (2008), the complexity theory in education is pragmatic in its philosophical orientation. This theoretical lens implies framing this study for a complex problem. As argued by Fook & Gardner (2007), "a holistic understanding of the complexity of experience, and the sorts of knowledge that support relevant practice in complex and unpredictable situations" (p. 26). In this context, my theoretical argument is that the understanding school classroom process is also one such complex dynamic phenomenon that requires multiple theories to find a pragmatic ground of interpretation. This assumption opposes radical mono-theorist, mono-paradigm, and mono-discipline approaches to classroom behavioral study. It gives a broad framework for ethical, epistemological, and ontological implications as key areas for the philosophy of education (Morrison, 2008). Classroom pedagogy is the key concern in the study. In complexity-informed pedagogy, instructional interaction and behavior in the classroom are professional endeavors involving the teacher which is the practice situation with uncertainty, complexity, instability, uniqueness, and value conflict (Schon, 2016) leading to the emergence of professional pluralism.

The complexity theory emerges to address the inherent interactive process which could not be addressed by the theories developed in the background of rationalistic, deterministic, and clockwork order (Morrison, 2008) and systemic understanding of phenomena. Slattery claims that complexity replaces certainty (Slattery, 2006). Morrison (2008) argues that:

Predictability, causality, patterning, control, universality, linearity, continuity, stability, and objectivity, all contributed to the view of the universe as an ordered mechanism in albeit[although] complicated equilibrium, a rational, closed, controllable and deterministic system susceptible to comparatively straightforward scientific discovery and laws. This view has been increasingly

challenged by complexity theory, which suggests alternative ways of conceiving the world and, thereby, of researching it. (p. 16)

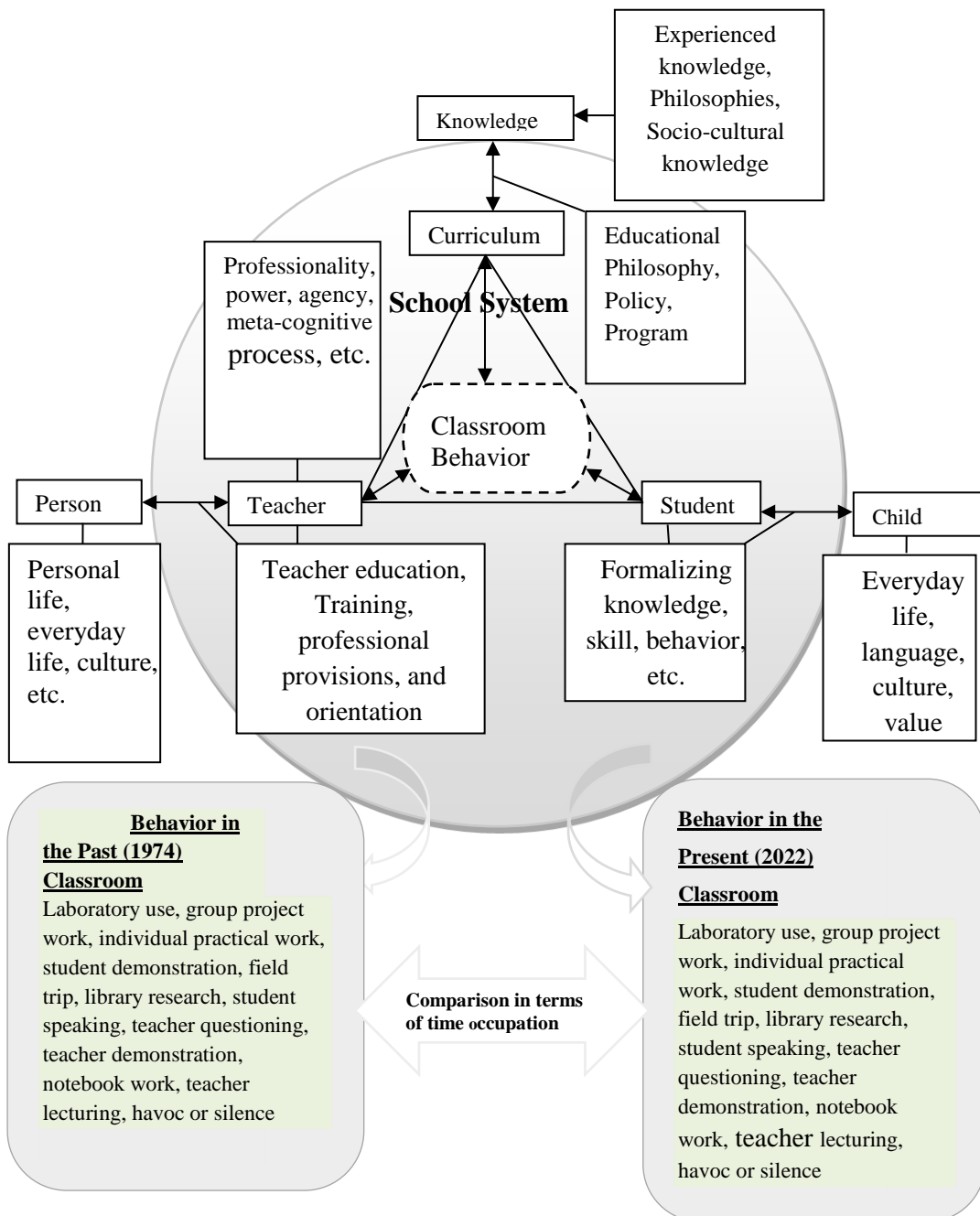
A phenomenon is a whole itself going through the regular evolving process of interaction, integration, formation, and transformation. The interaction of the classroom occurs in a complexity caused by deliberate and spontaneous elements. The interaction is an inherently complex dynamic process in the classroom. De Toni and Comello (2010) developed seven principles of complexity theory. They are: a) self-organization, b) edge of chaos, c) hologrammatic principle, d) impossibility of prediction, e) power of connections, f) circular causality or non-linear, and g) try and learn (De Toni & Comello, 2010). According to them, self-organization is the process of spontaneous creation of order, new structures, and new forms of behavior in systems; the edge of chaos means the zone of dynamic equilibrium between order and disorder or coexistence of the opposites, i.e., order and chaos; hologrammatic characterizes parts in a whole which are diverse and a part itself is whole; the impossibility of prediction means uncertainty; connections are complex, numerous and powerful; circular causality is nonlinear relation of cause and effect; and new learning is through "try and learn principle" in a complexity. Complexity thinking emphasizes non-linear and dynamic interactions between multiple variables, within indeterminate and transient, open and dynamic systems of incredible scale, supporting the case for connectionist and holistic analysis (Mason, 2008). It tells researchers that phenomenal existence is dynamic, whole in itself, and interactive.

The human setting and activities are complex and abstract to understand. As stated by Chave (2016), "the complexity theory argues that environments, organization or systems can be complex" (p. 143). The classroom of a school system is the human context interaction occurring between teacher and students. Mason

(2008) elaborates that a complexity approach focuses on all levels, whether on the individual, class, school, or national or international associations, revealing humans and human endeavor as complex and that focusing on one level will not reduce the multi-dimensionality, nonlinearity, interconnectedness, or unpredictability encountered. Human behavior is constituted of several different elements of non-linear connections. From this theoretical framework, it is concluded that classroom behaviors are complex processes caused by diverse factors.

Complexity theory is transdisciplinary thinking for classroom interaction pedagogy. Neuhauser (2018) argues that transdisciplinarity is regarded as a unified concept to address a complex problem. Complex problems are an interactive process of multiple elements. This theory emphasizes the process rather than the content (Morrison, 2008). The theory leads a study to beyond disciplinary limitations. It crosses the traditional concept of disciplinarily. The complexity of a process phenomenon is insufficient to understand within a disciplinary boundary of knowledge. Hence, Morrison argues that disciplinary boundaries dissolve as connections among areas of knowledge are permeable, fluid, and hypertext-linked (Morrison, 2008). In this way, the complex theoretical framework has allowed the studying of the classroom interaction and teacher and student behavior from multiple theoretical perspectives and identifying the interplay and interaction of dynamics to the classroom behaviors. The classroom instructional behavior, embedded in the course of the chronosystem, as a phenomenon “extends over the life course, across successive generations, and through historical time” (Bronfenbrenner & Morris, 2006, p. 793) in a process of dynamism. This implies that classroom dynamism is the process of emergence, unpredictability, and self-organization, edge of chaos, nonlinearity, and power of connections caused by multiple dynamics.

Conceptual framework. This conceptually evolved framework was firmly based on the thematic, policy, theoretical, and previous empirical literature review in the field of classroom instructional behavior. The explored instructional behavioral variables (laboratory use, group project work, individual practical work, student demonstration, field trip, library research, student speaking, teacher questioning, teacher demonstration, notebook work, and teacher lecturing) from the empirical literature review have come to the core to germinate an intellectual idea. The behavioral variables categorically represent teacher-centered and student-centered instructional behavior. A constant effort through policy and program has been made to transform the behavior. In this context, the framework seeks to identify behavioral dynamism or transformation by measuring and comparing the classroom behavior of the teacher and students involved in teaching-learning in the past by 1974 and present in the year 2022 in terms of time occupied by the behavioral variables in classrooms. Casting the light of systems ecological theory and complexity dynamic systems theory on the variables, a conceptual framework emerged to test the dynamism of the variables and their interaction with instructional systemic forces like teacher education, training, professional provisions and orientation, professional background, everyday personal life context, educational, policy and program, curriculum intents, student psychological and everyday context, knowledge, language, social values, local school system, environment, etc., in the classroom instructional context.

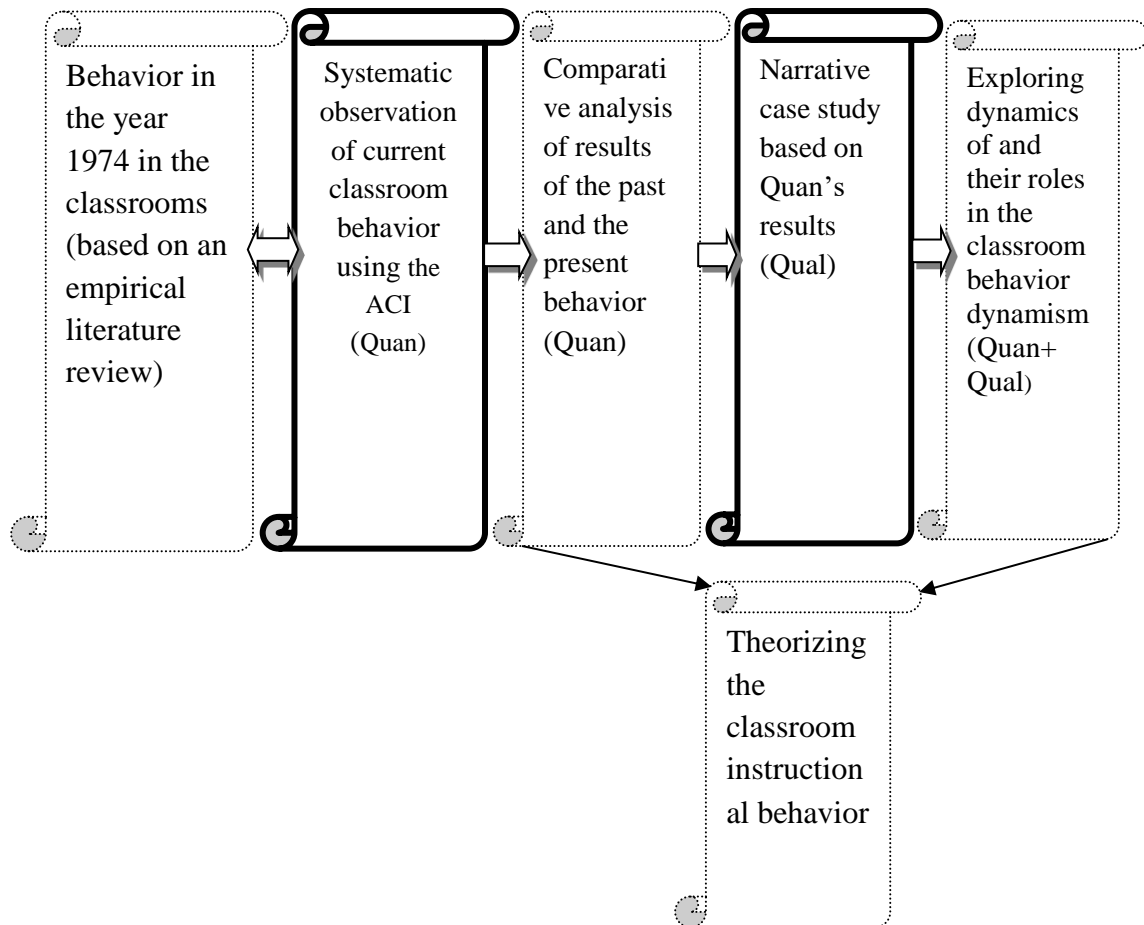
Figure 1*Instructional Behavior Dynamism through Complex Dynamics*

The framework postulates complex interactive relations of the phenomena. Stating more categorically, the instructional behavioral variables and their inter-influence with the teacher and student's everyday life, teacher's professional aspects, instructional systems, and epistemological stance derived from the aforementioned literature have been presented in Figure 1. This

framework helped to understand the research problem explicitly and presented a roadmap for the researcher to empirically test it. The observable behavior enacted by the teacher and student and the perceived information expressed by the teachers about their professional lives were intended to be explored. The evidence based on this framework gives an observed meaningful picture through the research. Figure 1 shows the conceptual framework which hints at the behavior in complex dynamic systems context. This suggests the need for a holistic and thorough study to understand the classroom instructional behavior in which many systems are involved in an interactive position.

General Procedural Framework of the Study

A general procedural framework was developed to carry out the research work in a sequential manner. The framework establishes the relation between the statement of the problem, research question, and theoretical and conceptual frameworks with research methodology. The framework depicts the operational structure of the study. Figure 2 shows the procedural steps of the research activities. The procedural framework shows the procedural steps of the research by a) drawing the defined instructional behavior variables with the values of the past classrooms in Nepali school system by reviewing the empirical literature, b) collecting and finding the quantitative value of the present instructional behavior in the classroom through a systematic classroom observation by using a video recording device, and coding as per the rule of ACI., c) comparing the values of present behavioral practice with the past using statistical tools, and d) conducting second phase qualitative research to explore dynamics associated with the behavioral state found from the quantitative research and analysis.

Figure 2*Step-by-Step Research Process*

In this way, the dissertation development by studying the behavioral dynamism of the classroom was based on the major six sequential works that comprised reviewing and exploring base-line data, empirically researching the current behavior status, comparing past and present behavior-related data, exploring classroom behavior dynamics through narrative interview, and theorizing the classroom behavior.

Chapter Three

Research Methodology

This chapter presents a framework of field research responding to the research questions. The framework consists of worldview, research design, sampling, data collection methods, procedure, quality of research, and ethical considerations. Dealing with these aspects of research methodology, this chapter provides the ground for using various approaches with the potential for procedural “justification” (Clare, 2004, p. 20) for this study.

Research Paradigm

Paradigm is conceived as a worldview (Morgan, 2007) which is a human intellectual construct. The research paradigm is the basic belief system that guides the researcher’s acts throughout the research project. It concerns axiology (ethics of a person in the world), ontology (nature of reality and nature of the human in the world), epistemology (relationship between the inquirer and the would-be known), and methodology (means for gaining knowledge about the world) (Denzin & Lincoln, 2018) primarily. That is to say, the research paradigm is the way of estimating, describing, and prescribing the nature of the value, reality, knowledge, and methodology. Paradigm reflects issues in the research community and has led to a diversity in the philosophical standpoints. The communities scrutinize particular research from an explicit philosophical position/paradigm. This implies that this researcher's foremost requirement is to make known to the academic research community a clear philosophical paradigm to justify the research activities and knowledge ground.

Among the worldviews, my research paradigm in this study belongs to pragmatism “to search for useful points of connection” (Mertens, 2010, p. 36) of

classroom instructional behavior in the context of complex dynamic systems. This paradigm rejects the either/or choices associated with the paradigm wars (Teddle & Tashakkori, 2009). Rather it emphasizes ‘what works’ at that moment and what is necessary to address the research questions. Accordingly, the present researcher explicitly demonstrated the position in action to justify the process and nature of knowledge generation and the methodology to be followed relying on the axiological and ontological belief system.

Axiology. Axiology refers to the role of values in inquiry (Teddle & Tashakkori, 2009). This infers that pragmatic research is a value-laden activity.

Hesse-Biber (2010) states them more precisely that:

Axiology means being cognizant of our values, attitudes, and biases and acknowledging how these might play out in research praxis in terms of (a) what questions are asked or not asked in our research, (b) what type of data are or are not collected, and (c) the type of methods, measurement, analysis, and interpretation that shape our understanding of the research process. (p.171)

Espousing the research as a value-bound activity, the researcher consciously carried out research works encompassing diverse values and ethical considerations and values in systemic cultural settings. I argue that the knowledge gained through the researcher's desired ends represents both the researcher's and the participants' values and politics which reveal ethical considerations as well.

Ontology. Pragmatism, in the context of this research, informs the nature of the real world is complex, dynamic, evolving, integrated, interdependent, and interactive. So, the truth of the classroom behavioral phenomenon is ever-changing and emerging. Pragmatic ontology does not matter the single or multiple reality.

There is a dynamic real world and all individuals have their own subjective

interpretation of that world (Mertens, 2010). This research did not tend to seek one or multiple realities. Rather it has focused on research problem and questions that indicate the complex and dynamic nature of reality. It implies that the instructional rule, policy, program, classroom structure, context, professionalism, and behavior are in an interactive set and dynamism. Hence, reality is evolving through the constant interaction of outside and inside of the human mind, and among the systems in a manner of interdependence and interrelatedness. No reality exists independently and statically.

Epistemology. The epistemic notion of pragmatism identifies that once generated episteme (knowledge) becomes obsolete to solve the problem that emerges in a dynamic context. This scholar, being a pragmatic researcher, integrates primary data and secondary longitudinal data sets (Mertens, 2010) to present the dynamically changing nature of behavioral episteme. To draw the epistemic meaning of the dynamic classroom context, this researcher employed secondary data from past studies and primary data from the current study to identify the longitudinally dynamic nature of behavioral knowledge. Similarly, this epistemic stance tells this researcher that absolute knowledge is incompatible with the practical problem of dynamic ontology. As a pragmatist, this researcher scholar believes that knowledge is a relational process rather than an isolated product. Epistemologically, the relationship between researcher and 'would-be known' in the pragmatic paradigm is determined by the researcher himself and what he considers would be appropriate in the particular study. Teddlie and Tashakkori (2009) argue:

Pragmatists challenge the distinct contrast between objectivity and subjectivity. They believe that epistemological issues exist on a continuum, rather than on two opposing poles. At some points during the research process,

the researcher and the participants may require a highly interactive relationship to answer complex questions. At other points, the researcher may not need interaction with the participants, such as when testing a priori hypotheses. (p. 83)

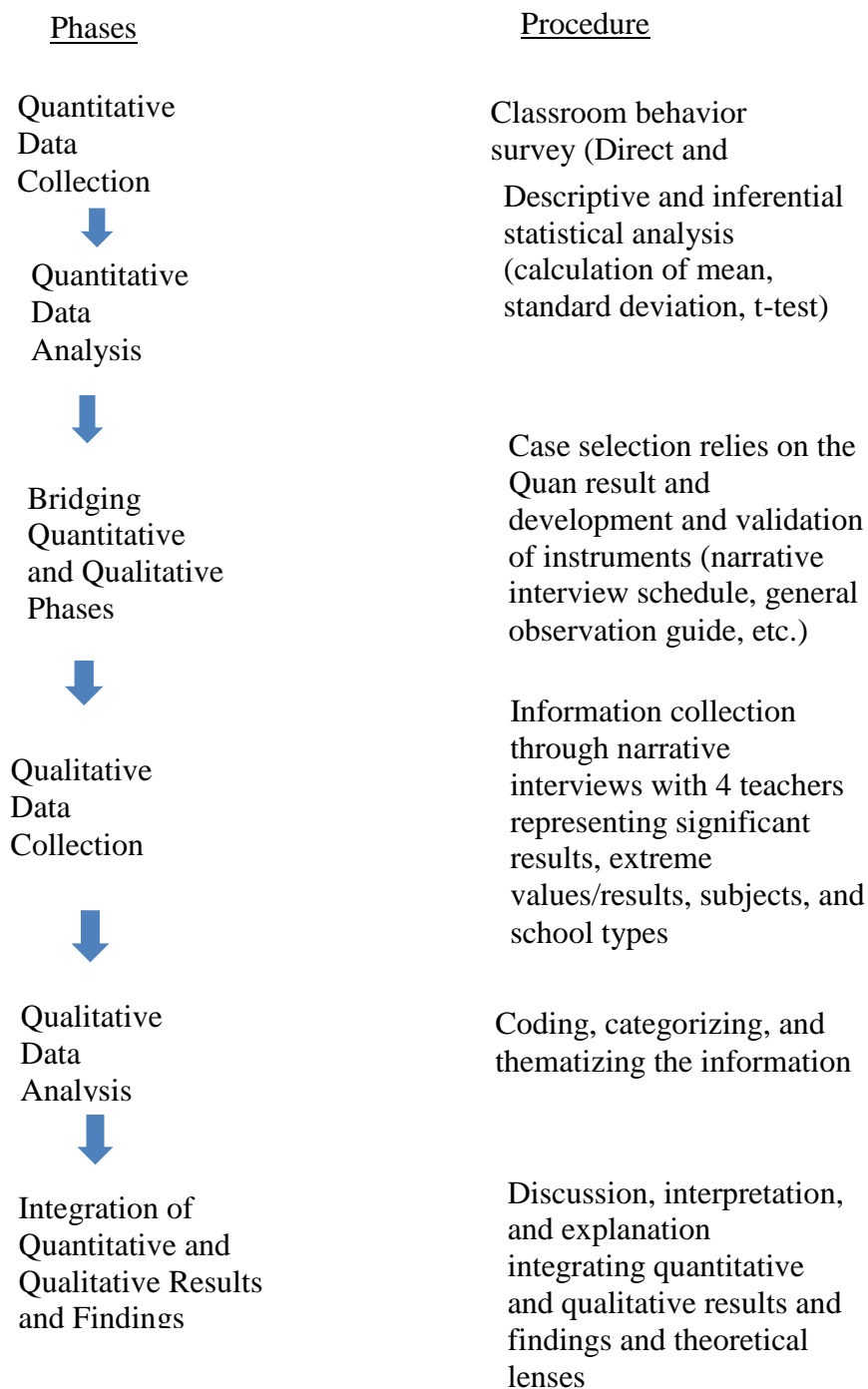
In this study, the researcher's roles were detached from research participants during the quantitative data collection phase while recording the observable behavioral information and attached to research participants during the qualitative data collection phase while eliciting covert behavioral information. This researcher adapted a flexible and changeable research behavior in the process of observable and unobservable knowledge generation. Hence, this researcher played diverse roles in generating information realizing the objective and subjective nature of knowledge. Ultimately, classroom behavior-related knowledge was co-constructed through the involvement of this researcher and research participants.

Methodology. Pragmatism offers the “pragmatic method” to this research activity to solve the problem of traditional philosophical dualism and make methodological choices (Teddlie & Tashakkori, 2009) ensuring their compatibility, usefulness, and practicality. The methodology used in this research relates to research questions and purposes which intend for quantitative and qualitative approaches (Creswell & Creswell, 2018; Denzin & Lincoln, 2018; Mertens, 2010; Morgan, 2007). The quantitative approach was not sufficient to collect information on the behavioral activities occurring in the complex context. Pragmatism allowed the researcher to use not a single view, approach, or method. Rather it opens up to different worldviews, different assumptions, multiple methods, and different forms of data collection and analysis (Creswell, 2009; Creswell & Creswell, 2018) for this single study.

In conclusion, the pragmatic worldview enabled the researcher to connect theories and empirical data moving back and forth through abduction, rather than either induction or deduction; to establish a relation of subjective and objective systemic behavior through inter-subjectivity and to balance context and generality of conclusions through transferability (Morgan, 2007). Pragmatically, the distinct value of objectivity or subjectivity, deduction or induction, relativity or absolutism, specificity or generality, quantity or quality, etc. is avoided in research activities. In this way, this researcher, as reiterated by Morgan (2007) emphasized shared meanings and joint actions of the involved people in the study. Hence, pragmatism enables this researcher to enjoy the complexity (Feilzer, 2010) while searching for useful points of connection (Mertens, 2010) of classroom behavior dynamism.

Research Design

The research design planned for this study involves the intersection of philosophy or worldview, strategies of inquiry, and specific methods (Creswell, 2009). Methodologically, coherence, consistency, and interconnection of the components are the essences of a systematic and scientific research process that have been reflected in the design used. Responding to the research objectives of the study requires classroom behavior-related quantitative and qualitative data/information to be elicited. The design of the information collection process determines what types or nature of information would be elicited from the sources of data. For this research, the explanatory sequential design of the mixed methodological approach (Creswell, 2009; Creswell & Creswell, 2018) was adopted. The design involved two research cycles to be carried out in two phases consecutively which are methodologically aligned to quantitative and qualitative approaches. Figure 3 shows the procedure of the mixed-methods sequential explanatory design, as suggested by Ivankova et al. (2006).

Figure 3*Steps of Explanatory Sequential Mixed Method Research*

In the first phase, the research was conducted by using a quantitative approach that followed an observational survey design. The research in this phase concerns collecting and analyzing the evidence of overt instructional behaviors being enacted in the classroom. The research was a rigorous, systematic, accurate, and direct

observation to unitize the instructional behavior activities which yielded quantifiable results. A descriptive comparison as well as an independent one-sample t-test between the statistical results, or statistical means derived from the study of Pfau (1977) and from this researcher's work, were performed to identify whether there is a difference between the past and the present instructional behavioral variables in Grade 9 classrooms in terms of time occupation of the variables. Hence, the sample means obtained from this research are compared with the means obtained from the empirical literature review rather than from the same field study. So, this value is regarded as an external value representing the classroom behavior of science and social studies teachers in Grade 9.

In this one-sample t-test, the difference between the two means from one another is assumed due to the influence of the independent variables (Dunn, 2001). The independent variables, termed instructional dynamics in this study, have been explored through qualitative study. The following hypotheses were proposed to test to determine whether there was a change in the behavior of teachers and students in science and social studies classrooms. The symbol mu (μ) used in the syntaxes for hypotheses denotes the current sample population mean of their instructional behavior categories and mu naught or mu zero (μ_0) denotes the then teacher sample population mean of the behavior categories. The values on behavioral variables in mean percentage of the then population are individual practical activities (.0), group work or project work (.0), student reports and field trips (.0), student demonstration and presentation (.0), student speaking (6.6), teacher questioning (7.0), notebook work (.8), demonstration, audio-visual (.8), lecturing (81.3), and silence or havoc (3.5) in social studies; and laboratory experience (open) (.0), laboratory experience (structured) (.07), group projects (1.03), student demonstration (2.73), student library research, reporting, and field trips (.0), student speaking (7.36), teacher questioning (3.20), notebook (11.02), demonstration and audio-visual (.91), teacher lecturing (68.60), and silence and havoc (5.08) in science teaching behaviors or activities.

Among the behavioral variables given in Table 1, the constructed hypotheses tests were run only for the variables suggested by the results of normality tests.

Table 1

Proposed Hypotheses for Mean Comparison on Behavioral Categories

Subject	Behavioral Variables	Proposed Hypotheses	
Classroom Instructional Behavior Activities in Science Subject	Student Activities	H ₀ : The mean values of the time occupation of the instructional behavior categories in the present and past classrooms of the changing professional context embedded in the complex dynamic systems do not differ significantly. H _A : The mean values of the time occupation of the instructional behavior categories in the present and past classrooms of the changing professional context embedded in the complex dynamic systems differ significantly.	
			Laboratory work activity (open)
			Laboratory work activity(Structured)
	Teacher Activities		Group project activity
			Student Demo., Presentation
			Student library research, reporting, field trip activity
Teacher Activities	Student speaking		
	Teacher questioning		
	Notebook/Workbook Use		
Teacher Activities	Teacher lecturing		
	Teacher demonstration of audio-visual aids, ICT use		
	Silence or havoc		
Subject	Behavioral Variables		
Classroom Instructional Behavior Activities in Social Studies Subject	Student Activities	Individual practical activities	
		Group project activity	
		Student Demo and Presentation	
	Teacher Activities	Student library research, reporting, field trip activity	
		Student speaking	
		Teacher questioning	
Teacher Activities	Notebook/workbook use		
	Teacher lecturing		
	Demonstration, audio-visual aids, ICT use		
	Silence or havoc		

The distribution of the variable values in teacher questioning, lecturing, and silence or havoc in both subjects; and student speaking, and notebook work behavior in science subject were found normal in the Shapiro-Wilk (SW) test for normality, which were selected only for a one-sample t-test. The results of the normality test are

given in Table 6 and Table 9 in [Chapter Four](#) representing science and social studies respectively.

In the second phase, qualitative research, on classroom behavior, was conducted to elicit the deeply rooted feelings, values, perceptions, and understanding of lived instructional activities of classroom teachers and their interaction with environmental factors. Narrative interviews were employed to collect holistic and natural information on teachers' lived experiences and to explore causal dynamics. The role of the researcher in this stage was to be a responsive human instrument. This technique consists of the elements of experience, time, personal knowledge, and reflection and deliberation of research participants (Clandinin & Connelly, 1989). Narration contains human stories of lived experience. For Webster and Mertova (2007), the narrative illuminates human actions and complexities. They further argue that it is currently being realized as an alternative and "a more holistic approach to address issues of complexity, multiplicity of perspectives, and human centeredness" (Webster & Mertova, 2007, p. 35) in education and as well as in other fields.

The covert behaviors, like teachers' background, personality, interests, knowledge, intentions, and preferences, influence much of what occurs in the instruction overtly, such as the strategies they employ in different situations, the timing and nature of their questions and explanations, and their responses to students' behavior (Wragg, 1999). The covert behaviors play an influential role in the teacher and other actors' instructional acts. In this context, a quantitative approach is not sufficient to study covert behavior; it requires a qualitative approach. For a holistic understanding of human behavior through research, the design was carried out by mixing up quantitative and qualitative methodologies at the level of plan and action of the instrumentation, sampling, data representation, data processing, and results

presenting in the single study undertaking a sequential manner; so that, the study would respond to the holistic and complex nature of behavior dynamism and its dynamics.

Study Population, Sample, and Sampling

The sample characteristics and sampling process are determined by the purpose of the research and its design. As the research was divided into two consecutive phases of quantitative and qualitative, the sampling techniques followed for the respective two segments were probabilistic and non-probabilistic sampling. The sample size for quantitative research corresponds with the sample size employed in the previous study which was referred to compare with the findings of this study.

Population homogeneity in a formal setting. The focus of this study was to explore the status of behavioral practice in the formal setting under the instructional system. From a systemic perspective, a school classroom where instructional behavior is enacted is a subsystem within a whole school system, which in turn is a subsystem of the state or national education system (Burns & Knox, 2011). This means classroom instructional behavior variables are interconnected with the wider policy systems. Nepal government's instructional policy intents are the same for all schools, classroom systems, and instructional activities across the nation. Specifically, the NCF and subject curriculums and TGs for core subjects including science and social studies are official documents that imply uniformity in implementation in the classroom contexts. There are layered systems connecting international policy to classroom actors that consist of supra-, macro-, meso-, and nano-level educational and instructional policies for the formal context (Leyendecker et al., 2008). Conceptually, they are understood as having a uniform influence on classroom practice.

The major purpose of the sampling is to compare the instructional behavior in the classroom of the prevailing policy system in the present with the behavior of the policy system that prevailed in the past within the formal course of the instructional system. The teachers' instructional attributes under the same policy system are assumed to be homogeneous. In this line, Broer et al. (2019) argue that centralized policy, also conceived as a macro system, generally leads to the standardization of curriculum, instruction, and central examinations in an education system. The statistical population employed in this research is drawn from the teacher population under the same policy system of entry requirement, instructional policy, system time frame, teaching subject and grade, and formal setting which is assumed to be homogeneous in terms of professional attributes. Considering this professional context, convenience sampling was used to select the research site among the districts governed by the same macro instructional system. Hence, this study focused on science and social studies teachers in grade 9 within the schools of Bhaktapur district. This population is representative of schools in the Kathmandu Valley and nearby districts, along with the respective subject teachers in those areas. The characteristics of this population enhance the validity of comparisons between the results of this research and the past studies, as well as the potential to generalize the findings to a broader context.

Etikan et al. (2016) state that the main assumption associated with convenience sampling is that the members of the target population are homogeneous. There would be no difference in the research results obtained from a random sample, a nearby sample, or a sample gathered in some inaccessible part of the population. Relying on this sampling theory, this researcher selected fourteen sample secondary schools (N=14) by employing simple randomization from a nearby district,

Bhaktapur, including sample classrooms of Grade 9 science teachers (N=14) and social studies teachers (N=14) belonged to the school systems for this research (see Appendix G). For the randomization, the researcher employed the Excel RAND () formula. The generated random numbers using the formula for the sample school codes were to eliminate the researcher's probable bias in sample selection.

Categorically already sampled and defined instructional behaviors were in the plan to record. To ensure representativeness and generalizability of the collected instructional behavior from the classrooms of the two subjects, a minimum of four class sessions and a maximum of one week or seven days of classroom teaching sessions were in a plan to record from each sample school. Similarly, the representation of the instructional behavior across the academic session and course was consciously kept in the researcher's mind for the validity of the study. In this way, the behavior recorded is representative, valid, and generalizable to the present professional teacher population. However, the main concern of this research design was to compare the classroom behavior of the two instructional systemic contexts in terms of the continuum of time, that is, the classroom behavior in the present and in the 1970s or during the NESP.

For the qualitative research sample, it was planned to select that could respond to the reasons behind the behavior status resulting from the quantitative research and data analysis. Four respondents (N=4) were purposefully selected from the research participants involved in the quantitative research.

In conclusion, layered processes were followed to approach the classroom context-nested instructional behavior. In this systemic context, the explanatory sequential mixed methods sampling followed probability and non-probability or purposeful sampling strategies for quantitative research and qualitative research

phases sequentially produced representative behavioral data for the unit of analysis (Teddle & Yu, 2007). The behavior knowledge generated through this study has the potential to generalize statistically and analytically (Firestone, 1993; Polit & Beck, 2010) to school classroom instruction and other professional fields.

Research subject-drop out. In one-sample school, a science teacher did not continue her school job who had voluntarily nominated as a research subject. The school authority appointed a new teacher in her place after three months. The newly appointed teacher who could be the participant in this study was also on leave due to personal reasons.

Research Methods, Instrumentation, and Data collection

Methods represent a range of approaches used in educational research to gather data which are to be used as a basis for inference and interpretation, for explanation and prediction (Cohen et al., 2007). The pragmatic research methods deal with human behaviors from three situations where shared meaning and joint action remain at the center. Regarding the three situations, Morgan argues, "the essential emphasis is on actual behavior ("lines of action"), the beliefs that stand behind those behaviors ("warranted assertions"), and the consequences that are likely to follow from different behaviors ("workability")" (Morgan, 2007, p. 67). Furthermore, Mertens (2010), from a pragmatist's perspective, stresses the lines of action to be specific methods of research that are seen to be most appropriate for studying the phenomenon at hand. Accordingly, this researcher planned two-phased methods, i.e., first the quantitative and then the qualitative method instrument.

Systematic classroom observation. The observation method was selected for this study because it appears to be a more promising approach than verbal statements of behavior that are self-reported by informants (Stausberg, 2012). Among different

types of classroom observation methods, systematic observation, also known as systematic direct observation (SDO) (Hintze et al., 2002), is popular in the field of classroom behavior study. It has been referred to as a structured, formal, and scientific observation, and has been regarded as a major tool of science (Michaels, 1983) and scientific study. The structured feature of systematic classroom observation signifies a controlled and planned observation using an observation protocol (coding scheme) specifying behavior categories of observation (Stausberg, 2012). Following a structured observation process, the researcher defined the universe of study, determined the units of observation, gained access and permission for observation, focused instructional behavior activities, worked on the observation protocol of the ACI, followed scheduled observation, digitally recorded the classroom activities, and coded observing the videos of classrooms. In this research, SAMSUNG, Galaxy f22 smartphone was used to record the live activity evidence and ACI code evidence.

Instruments and data collection. The first phase of the study was quantitative research for which deductive, systematic, reliable, and generalizable data collection methods and the instrument were used. Quantitative research is supposed to yield reliable, valid, generalizable, and replicable results. For this, the human and non-human instruments are scientifically tested and validated. In this research, the ACI was reviewed by experts, and a manual was developed (see [Appendix B](#)). Then, the ACI along with the video recording device and the observer were involved in the field try-out and training. The ACI was already tested, scientifically proven, and validated for classroom behavior research.

Activity categories instrument (ACI). ACI developed by Caldwell (1967) is considered a fundamental instrument to observe the behaviors of teachers and students in instructional situations. The ACI is a pre-coded quantitative instrument for

classroom observation research. It is an interval recording of a quantitative approach. The interval of recording is predetermined and defined categories of behavior are coded at the end of each interval (Smith & Ballard, 2013). According to them, it yields both events/frequency and duration of behavior and also how the behavior is distributed across the total time. The categories of coded behavioral activities in science subject teaching are laboratory experiences (open-ended and structured), group projects, student demonstrations, student library research, reporting, etc., student speaking, teacher questioning, workbook work, teacher demonstrations, lecture, and general havoc (Caldwell, 1971; Pfau, 1977). A detailed description of the activity categories is given in [Appendix B](#). For the context of Nepalese classroom research, Pfau (1977) made a bit to ensure its practicality and contextual compatibility. The categories of behavioral activities classified as indirect and direct activities by Caldwell (1971) have been revisited and re-termed by Pfau (1977) as student-centered activities (laboratory experiences, group projects, student demonstrations, student library research, reporting, and field trips, a student speaking, and teacher questioning), teacher-centered activities (notebook work, teacher demonstrations and audiovisual aids, and lecture) and silence or general havoc to respond the Nepalese classroom context. Similarly, the ACI for social studies classroom observation was developed to survey classroom behavior. These ACI tools of Caldwell for classroom behavior research were used in this study.

Why was the ACI chosen for classroom behavior study? The main purpose of this research is to observe the difference between the past and present classroom behavior of teachers using a one-sample t-test. The validity of this study directly concerns the instrument and its contents used at that time and being used at present.

There are very pertinent logics that give validation of selecting the ACI instrument for this study.

Firstly, the ACI is a generalized standard observation instrument that has been tested and used by researchers in different cultural and systemic contexts to measure the behaviors of teachers and students. Such standard instruments and procedures are fundamental considerations for the researcher who is interested in conducting a comparative study. Gall et al. (2003) state that if standard observation forms are used in research, the results obtained could be compared with the previous study results. This study also intended to compare the classroom instructional behaviors of the teachers who were working in the period of implementation of the National Education System Plan (NESP) and who were working during the period of this research. Such studies were conducted at different times, locations, and by different researchers. Pfau (1977) states:

The development of new instruments, however, has the disadvantage of not permitting researchers to make comparisons of new data gathered with the data previously gathered by other researchers. That is, the use of already existing category systems permits researchers to more directly build upon the results of research conducted by others, including the making of comparisons with data gathered by others. (p. 236)

Using the ACI by Pfau, the results yielded on the activity variables specified in the instrument represent the classroom behavior of the then teachers teaching science and social studies subjects of Grade 9.

Secondly, the sample instructional behavior categories in the ACI are still relevant. The behavior categories represent the instructional activities usually occurring in a formal classroom setting which are at the core issue of the

transformation of classroom practice. That is behaviors are concerns of the national and international pedagogic discourses for classroom transformation. Hence, it has been a perennial issue of classroom instruction that reflects the ACI's relevance in present classroom behavior studies as well.

Thirdly, the ACI categories have represented the possible behaviors that occur in science and social studies classroom teaching in Nepal. The instructional intents of the official curricula of the two subjects inform teachers to use the activity categories for classroom teaching. Its description is given in the Content Validity section of the chapter.

Familiarization with the ACI: The foremost task for handling the ACI was to have familiarity with the instrument. Thus, this researcher reviewed literature related to this instrument. The literature revealed that it was developed on the grounds of recommendations made by the specialists of curriculum and instruction emphasizing the students' learning by experiencing the laboratory activities, involving in inquiry and investigations, and consulting several references apart from the prescribed textbooks (Caldwell, 1967). As noted above, Caldwell stated that the method courses are expected to change the behavior of teachers. Caldwell developed this instrument to measure the teaching behavior of elementary science teachers who were exposed to the in-service training program (Caldwell, 1967; Pfau, 1977). The instrument was tested in the classroom system in the US, and Nepal as well. The manual, *Activity Categories: An Instrument for Quantitatively Recording Activities in a Science Class*, prepared for classroom observation research in the context of Nepal was obtained from Richard Pfau, who conducted his research according to the manual. The manual contains the ACI tool, the ground rules for encoding behavior categories, the

procedure of data processing, and a sample table for data encoding in an explicit and precise manner.

Getting familiarity with and understanding the activity categories and their descriptions of the ACI is a fundamental task for researchers who tend to use standard and scientific research instruments. The interobserver/inter-coders agreement coefficient between Caldwell and Pfau was .886 (Pfau, 1977) on the ACI which indicates that the interpretation of content and process of use of the instrument for observation is approximately the same. It shows high reliability of data yield and validity and authenticity of the instrument use. The eleven categories of instructional behaviors and their descriptions were, systematically studied, and found very much relevant to measure teacher and student behavior in today's classroom context as well. For this research purpose, the consensus between the expert and novice (between Richard and this researcher) on behavior variable descriptions and practice on the procedure and the relevance of behavioral variables given in the instrument is discussed in the Reliability and Validity section of this chapter.

Updating the ACI: After reading and acquiring familiarity with the ACI categories and their descriptions, I thought to add ICT-related activities as subcategories. However, major categories have not been changed in the instrument. The main purpose of using this instrument and its categories is to measure the activity variables and compare them with previous research findings based on main categories. Among the major categories, in the description of Activity Category 5, related to student library research reports, 'Internet search' has been added in the science ACI, which falls in Category 4 in the social studies ACI. Similarly, the subcategory ICT instruments use was added in the original ACI in its major category 9 where teacher demonstrations and audio-visual are originally given as activity

categories. The updated version of the ACI was reviewed by two experts in curriculum, pedagogy, and educational research. Apart from the content update, technical rules for video recording and coding and ethics and confidentiality in classroom video recording observation have been introduced in the ACI system through this research.

Video recording instrument. The use of video recording in research is becoming more common these days. Video technology has turned the systematic classroom observation approach to analyzing teaching and learning into a powerful means of rigorous analysis of teaching and learning practices in classrooms (Klette & Blikstad-Balas, 2018). Video recorders have the advantage of providing permanent data of the recorded behavior that can be coded later. Klette and Blistad-Balas argue that video data make it possible to record, review, edit, analyze, and synthesize different instructional practices. For video recording, the device with features- SAMSUNG, Galaxy f22 Mobile (48MP), f/1.8 (wide); PDA 8MP, f/2.2, 123°(ultra-wide); ¼.0", 1.12µm 2MP, f/2.4, (macro) 2MP, f/2.4, (depth) and video1080p@30fp was used. The ACI with its eleven behavior categories was followed to encode the recorded activities.

Video recording for quality data. This researcher selected a video recording approach to facilitate estimating the reliability and validity of the data collected. Video recording provides exact and permanent evidence of the natural classroom activities. This is considered better than the traditional live observation and encoding method. Liang's (2015) study found the video recording observation effective in reducing reactivity and subjectivity.

Preconditions of quality research. Research quality is associated with the observer, instrument, and process involved in the data collection. Systematic

classroom observation is conducted with preplanned, standard, and explicit criteria. To meet the scientific assumptions, instrumentation, field tryout, training, and reliability and validity assessment are considered preconditions.

Instrument validation. Validity is the quality of a research instrument which refers to what it purports to measure in terms of research objectives and questions. Research question 2 seeks a comparison between the status of classroom behavior in the year 1974 and that in the year 2022. This requires a standard tool, an explicit format, and a procedure that could ensure a valid comparison to observe whether there is a change in classroom behavior or not. This informs this researcher to adapt the ACI tool developed by Caldwell (1971) and its variables and procedural framework which was practiced by Pfau (1977), and revisited by Guthrie (2011) to ensure a valid comparison with the past status using the prespecified behavioral variables. In addition to this, content-related validity, criterion-related validity, observer validity, construct validity, and contextual validity have been maintained.

Content-related validity. This researcher, who is also an instructor for the Curriculum and Evaluation course of the undergraduate education program, reviewed literature related to curricular policies and university pedagogical courses. He analyzed the social curricular materials like the NCF, subject curricula, and teacher guides. The National Curriculum Framework has given general pedagogical guidelines stating the importance of learning-centered strategies like project work, group work, case studies, etc. (CDC, 2007; Curriculum Development Center, 2019). This discussion is related to the present subject curricular documents to analyze the content validity of the ACI. The contents in the ACI mean the ten instructional activity categories. These variables are subjects of analysis to judge content validity corresponding to the existing written subject curriculum.

The existing subject curriculums developed by the CDC have specified the instructional methods for each subject and content. The instructional methods given in the science curriculum are lecture, question-answer, demonstration, experimentation, discussion, field study, and project work (CDC, 2014). Similarly, the teacher's guide developed by the CDC to provide specific guidance in classroom instructional activities has also emphasized the methods given in the curriculum. Furthermore, the intent of TG for science teachers stresses activity-based classroom instruction discouraging teachers' lecturing behavior. The curriculum also specified instructional methods for the social studies subject of Grade 9. As it has been given in the curriculum document, the intended instructional methods are lecture, question-answer, problem-solving, observation, role play, experimentation, inductive inquiry, demonstration, discussion, discovery, project, field trip, case study, and critical thinking (CDC,2014). The TG based on this curriculum document has prescribed the teaching-learning activities more precisely. The behavioral variables in the ACI for science and social studies are laboratory use (in science), individual practical activities (in social studies), group work, project works, student demonstration and presentation, student library research, field trip and reporting, a student speaking, teacher questioning, notebook work, teacher demonstration, and a teacher lecturing.

Expert judgment was also sought to triangulate with the literature-informed validity of the instrument. For this purpose, the ACI instrument with the behavior categories and their descriptions were shared with two experts who have expertise in curriculum, pedagogy, and research. In their review of the instrument, the contents in the instrument are found relevant to studying classroom behavior in the present context of Nepal.

In conclusion, the ACI content variables for science and social studies have represented the instructional strategies that have been set in the official or written curriculum of the subjects. Therefore, the ACI ensures content-related validity and relevance for this study of instructional behavior in the present classrooms.

Piloting and training for observer validity. Observer validity is a primary concern in systematic classroom observation using the ACI. For this reason, piloting was the most important phase of this study for validation of the observation and encoding activities. Piloting was also a training process for this observer and coder. The coder is a key contributor to the reliability and validity quality of content analysis (Whitley Jr et al., 2013) of the ACI and instrument handling. To perform a complete task of classroom observation using a recording device, there should be integration among the human coder, recording device, and coding manual for quality behavioral data. Neuendorf (2011) states that:

Human coders are an integral part of the measurement device. Thus, nothing is more important to the valid and reliable measurement process than coder training. Training should involve both a full discussion of the coding scheme and a series of group coding sessions. (p. 283)

Piloting and training were simultaneously adopted in this study. As a very preliminary try-out, two schools were selected from Kathmandu and Bhaktapur Districts, one school from each district (see Appendix F). The school was visited for four days. The first day was for rapport-building and informed consent with the school administration and subject teacher. On that day, the official teaching schedule of the science teacher teaching in grades 9 and 10 was obtained. According to the schedule, on the second day, the science class teaching of Grade 9A was live encoded and as well as video recorded. The competency required for live encoding, using the

ACI Coding Sheet, at every five seconds was realized. At the same time, the possibility, difficulty, and effect of video recording in the classroom were first time experienced and got the opportunity to assess. Only after four days, another class observation became possible due to the leave of the teacher. One more day of school visits was made for the classroom observation practice. At the end of the piloting, video encoding based on the ACI manual was also practiced. It was a process of training to use ACI accurately and record classroom activities on video devices.

The video of the last day of the piloting test in the classroom was shared with the expert from the USA. The video was encoded independently by both the expert (RHP) and this novice researcher (KBC) following the coding manual. After completion of coding, the code sheets were exchanged through emails. Then, the degree of consensus on the expert (RHP) and this novice researcher (KBC) tasks was calculated by using Scott's Pi (π). It resulted in an agreement coefficient of .778. Based on this coding and result, the ACI expert provided feedback to this research scholar on the disagreed codes. After a few days, another video from a sample school classroom recorded during the initial research phase was shared and independently encoded again by both the expert and the novice researcher. The coefficient in Scott's pi value was .865. This coefficient value was found to be very close to the already established expert consensus value of .882. This represents the gold standard value (Bakeman & Quera, 2011; Yoder & Symons, 2010). Similarly, in Cohen's Kappa test, the result in the point-by-point agreement was 92% which is regarded as an excellent agreement level and Kappa value (K). Hence, Kappa-based demonstrations of coder agreement are essential for observer training and for checking throughout coding (Bakeman & Quera, 2011). This coefficient value was found to be very close to the expert consensus value of .882. After this piloting phase, this researcher

independently carried out the video recording and encoding of the videos of the school classroom of the research site incorporating experiences of pilot testing and following the coding manual. In this way, the consensus in coefficient value of the expert and trainee or this research scholar was compared with the gold standard to ensure the competency of this observer in handling the ACI accurately.

Reliability and validity of encoding process. In the process of piloting and initiating field data collection, this observer got orientation and training from the expert of the ACI, as mentioned in the previous section. Then two types of statistical checks, namely criterion-related observer reliability and intra-observer reliability (Gall et al., 2003), were operated. Firstly, criterion-related observer reliability was established by encoding the same videos by this observer (research scholar) and the ACI expert which yielded a .865 agreement coefficient (the process of this has been mentioned in the previous section). It shows this researcher and the ACI expert had approximately the same interpretation of the contents and process of operation of the instrument. Secondly, observing/ encoding the same video by this researcher at least twice in a reasonable time gap during and at the end of the video encoding was another process of establishing the reliability for this observer which has informed consistency on the encoding process of the observer. In this way, intra-coder reliability is another important quality aspect of this behavioral research which is discussed in [Chapter Three](#). Hence, the inter-coder reliability and consensus with the expert during the training made criterion for this observer to use ACI. The observer's training, clarity on the instrument categories and their definitions, internal consistency, and stability in the coding process have ensured the observer is valid (Roberson, 1998) to use the instrument in this classroom observation.

Criterion-related validity. To predict the future performance of observer competency and coding procedure, a pilot test was conducted before starting real classroom recording observation and coding the recorded videos. Under the supervision of the ACI expert, live classroom coding was practiced along with video recording. The detailed process of this pilot test, feedback from an expert, and coding consensus between expert and this observer have been already discussed in the Instrument Piloting and Training section. Scott's pi .865 result informs the high accuracy of this observer on the content interpretation and coding process. This value was considered as predictive criterion-related validity for the future coding accuracy in subsequent classroom research of this study (Bakeman & Quera, 2011; Yoder & Symons, 2010). The validity ensured the authenticity of using the ACI.

Contextual validity. This research was conducted in natural classroom settings which ensured the quality of contextual validity of the research. That is, the concepts, conclusions, or measurements of this research are generalizable across the contexts (Phillips et al., 2013). In the process of classroom data collection, the local idiosyncratic system and contextual sensitivity of each school were closely concerned. The researcher was well aware of the school context that comprises school premises, school building and classroom, gatekeeper, head teacher, teacher, non-teaching staff, and students which are governed by the particular school system. In sum, this school setting consists of humans, materials, and systems. The threats to contextual validity are relative, unstable, difficult to quantify, and not consistent across or within contexts (Skinner, 2013). Though it is the nature of threats, this researcher made telephone contact with the headteacher, frequent school visits, talk for consent, collection of school routines for teachers, and contact with the subject teacher through the headteacher. Then, only the researcher got access to subject teachers for classroom

data collection using a video recorder. Hence, specifically stating, human relations and behavior in the institution are psychological dimensions that are a furthermore sensitive and possibly more serious threat to classroom research. The contextual factors that were assumed as constraints were categorically dealt with as subject reactivity, ecological validity, and representativeness in this research process.

Reactivity reduction. In research, reactivity is an unwanted overt human behavior that can reduce the quality of data reliability. It is a behavioral change of research participants intentionally or unintentionally due to the presence of the observer or recording device (Cozby & Bates, 2018). It reduces the quality of the data's reliability, validity, and replicability. So, to reduce reactivity and maintain the quality of data, the researcher used some measures. First, the researcher introduced himself as just a data collector (not as an evaluator) identifying as a research scholar for the dissertation development. Second, there was no presence of a human observer in the classroom. Third, a familiar device i.e. smart mobile phone camera was used for recording. It is thought that "live video classroom observation is effective in reducing reactivity and helps avoid subjective judgment" (Liang, 2015, p. 1). Fourth, the video recording activity was kept on for four to seven session days to make the subjects used by the observer and equipment. (Cozby & Bates, 2018). Fifth, the subjects did not know the variables on which observation was going on. Sixth, the first-day observation was excluded for data processing of the high reactivity on the day. Seventh, the researcher did not pass on the information about a sample school class to another class. Similarly, the researcher did not make any suggestions or comments regarding the teachers' activities related to their classroom or any other. So, this researcher argues that there is minimal or no reactivity in data recording. Eighth, the researcher remained on the school premises only during the time of the class

recording session. Hence, the researcher controlled the factors that might affect the subjects' usual behavior.

Ecological validity. Ecological validity in this research concerns two dimensions. They are complex systemic natural contexts. From a systemic perspective, the classroom behavior of teachers and students is not isolated from the layered education systems. The behavior is largely determined by complex interactions with the environment (Shamay-Tsoory & Mendelsohn, 2019) which is, from the perspective of Bronfenbrenner (1994), called interaction with ecological systems. The spheres of systems' ecology, in this research, consist of national, district, school, and classroom systemic contexts. Realizing this, this researcher took consent from the district and school authorities for classroom observation research. So that, the result of the research would be ethical, acceptable, and valid. For pragmatic research, ecological compatibility is required for the validity and applicability of the results. From a natural perspective, ecological validity is the extent to which measurement contexts resemble or take place in naturally occurring or unmanipulated and frequently experienced key behaviors in the real world (Brooks & Baumeister, 1977). In this research, both perspectives were synergized in practice to maintain the natural observation of complex systems. So, it can be ensured that the result obtained would have generalizability in the science and social studies classroom contexts of grade 9 within the instructional system.

Representativeness. The practice of the categories of instructional behavior in the science and social studies subjects of grade 9 classroom contexts in the school systems was made representative in both curriculum contents and contexts. In science, 54 classroom teaching sessions of the randomly selected 13 teachers were recorded which covered 70% of curriculum content areas. Similarly, in social studies, 64

teaching sessions of the randomly selected 14 teachers were recorded which represented 47% of curriculum content areas. This ensured the content and pedagogical behavior of the teachers. Likewise, the randomly selected 14 schools for social studies and 13, excluding one dropout, science subject represented the main urban or city and outskirts of the city, low status and high status, community and institutional which generally gives a picture of Nepalese school contexts. This shows that the data of instructional behavior category in the two subjects drawn from the existing classroom practice are representative in terms of curricular contents and spatial contexts.

Classroom video recording and coding manual. The manual prepared for this research contains the updated ACI for science and social studies data coding form, the ground rules for coding, the technical rules for video recording and coding, and ethics and confidentiality in classroom recording observation. The ACI with its ground rules for elementary science was developed by Caldwell (1967) to study the impact of methodology courses, updated and extended by Pfau (1977) to study cross-country classroom behavior in secondary schools. I updated the science and social studies ACIs adding "Use of ICT instrument" as a sub-category for grade 9 to study the interaction of classroom behavior with instructional systems and its dynamism under complex dynamic systems. The present study is a video-based observation of the ACI. The coding manual explicitly gives guidance to the video coders and it also expects a standard criterion of training to administer it (see [Appendix B](#)).

Unit of observation. The unit of observation is an act that occurs every five seconds in the formal/official classroom schedule and setting interacting with specified instructional materials and students in science and social studies subjects. The unit of observation is the unit of measurement in the process of data collection.

Altogether 24,800 and 22,278 units of five-second interval observation in social studies and science subjects respectively were included in the analysis. This means the duration of the observation was approximately 124,000 minutes in social studies and 111,390 minutes in science. For Stausberg (2012), it is termed as an act, object, or event which are selected, determined, and planned before the research conduction as a part of research to get information for a unit of analysis. In this research process, the units of observation are specific instructional events like lecturing, student speaking, project work, notebook work, demonstration, etc. which are encoded every five seconds time unit. These overt behavior categories are referred to as units of analysis.

Unit of Analysis. The unit of analysis, dealt with the instructional behavior categories, is a key concern of the research process. The analysis of each behavior category specified and studied as an activity category in this study represents a unit of analysis. This is directly related to the research objectives and/or research questions. Neuendorf (2017) argues that the unit of analysis is the entity on which data are analyzed and for which findings are reported. The instructional behavioral variable and its session are regarded as a unit of analysis. Another thing is the unit of observation which is also known as a unit of data collection. This is recognized as an assignment of code to a particular behavior that occurs every five seconds. This is the entity that is observed, measured, and collected in the course of research to understand the unit of analysis (Blackstone, 2018). This produces information about the behavioral variable or the unit of analysis. The processes followed in this research to reach the unit of analysis from data coding are the assignment of code to behavior every five seconds, calculation of the frequency of each behavior category of a session recorded in a school classroom, calculation of the proportion and percentage of each behavior category concerning the recorded observation session time,

calculation of average time percentage for each behavior category from the calculated proportion and percentage of the observed sessions of science or social studies subject classes at a school, and computation of mean percentage on each behavior category using the calculated average percentage of fourteen sample school classrooms for each subject, science and social studies separately. The units of analysis employed in this study are based on Caldwell's Activity Categories Instrument (ACI).

Researcher Position Dealing with Data in the Natural Context

Data, in this research, are representations of instructional activities that were generated from the natural school classroom context. The activities took place at the center of the education system consisting of the various levels of the system. As argued by Teddlie and Tashakkori (2009), the research contexts are often complex systems with their norms, expectations, interpersonal dynamics, and insider-outsider boundaries. In this research, the researcher minutely analyzed the legal parameters, norms, expectations, interpersonal dynamics, and insider and outsider research boundaries and planned and enacted them in the field proceeding to the classroom setting of research in the systemic context. In this context, this researcher, being an outsider, had to follow some formal measures to gain entry into the field, working with gatekeepers, and ensuring cooperation (Teddlie & Tashakkori, 2009) for classroom research. The researcher first reached the Bhaktapur district authority for gaining a research permission in the district schools. The researcher received a consent letter (see [Appendix D.](#)) and a list of secondary schools registered to the education office, Education Development and Coordination Unit (EDCU). From the list of secondary schools, this researcher randomly selected fourteen schools and automatically selected the officially assigned social studies and science teachers for grade 9. Then, the researcher established contact with the headteachers or principals

of the sample schools by telephone; made the first time school visit; and sought classroom research consent (see Appendix E). With the facilitation of the school authority, the researcher contacted the subject teachers of science and social studies subjects of grade 9 and then the students of the class.

The first-day school visit was most important for the research. The meeting with the school authority, also known as the research gatekeeper (Patton, 2015), on the day, became a crucial moment for deciding whether the classroom recording observation would start or thinking of an alternative one. In the meeting, the types of classroom data, the process of data collection, or video recording process within the classroom, and the ethics and confidentiality were matters of talk and negotiation between the researcher and the authority (gatekeeper). The negotiation with the gatekeeper allowed this researcher to an actual physical entry into the setting to start data collection (Patton, 2015) by recording classroom activities. Then, the school routine was collected on the first-day visit which helped to make a plan for everyday classroom video recording. The officially allocated time for classroom teaching of the two subjects is given in [Appendix G](#) and [Appendix H](#) which was pursued through the classroom video recording observation. Two sample schools among the fourteen denied giving consent for classroom research. In one of the two schools, that was the first school where the field research began. The research activities of outsiders are not permitted even if to their alumni, according to the school principal. In the case of the second school, a community school, the headteacher of the school had raised confidentiality issues on classroom video regardless of the ethics and confidentiality promise and the consent letter of the district office, EDCU. Consequently, the two schools were replaced by the other two schools from the random list. Likewise, the third school was discarded due to the high teacher reactivity caused by their pre-

knowledge and consciousness about the variables being studied and students' reactive behavior towards the video recording.

In conclusion, being an outsider, the researcher had to receive official permission for research from the various levels of school administrative systems that enveloped the classroom settings. The school systems are being regulated by the local government in the federal democratic political system of Nepal. However, the layers in the education system, like, exo-, meso-, and microsystems and policies (Bronfenbrenner, 1979; Miller et al., 1999) were dealt with for classroom data collection. Hence, the research conducted with formal consent from the concerned levels of the education authorities has assured its legal and ethical requirements.

Classroom Activity-Data Capture in Official Context

Video recording captures and collects the instructional activities in a live, accurate, and natural form that justifies its rationality in this research. The technology for data collection adopted in this research indicates an innovative practice. Systematic direct observation is a traditional technique (Asan & Montague, 2014) for classroom behavior research which is likely less practicable in live classroom coding schemes. This video recording instead of using a human observer in the classroom has been possible due to the availability of affordable recorders like the Samsung Galaxy f22 smartphone device equipped with Quad- cam and internal storage of 128 GB, which was used in this research, and many more other devices in the today's tech markets. Likewise, the impetus for the movement and development of video research methods in different disciplines in new and exciting ways (Bates, 2014) encouraged the adoption of this technology. Furthermore, it has more pros than the traditional method (Asan & Montague, 2014). The video device, a smart mobile phone, with a tripod stand was set up on the desk on the left or right back side of the classroom. The

smartphone camera was turned to face the diagonal direction of the classroom so that all activities of the teacher and students were captured.

The new technique used in this observational research led to transforming systematic classroom observation. Videoing is not to replace the conventional technique. Rather it is to integrate into the conventional method i.e., systematic direct classroom observation. Therefore, this researcher argues that the data collection process covers the video recording to encoding using ACI. This method is recognized as a video recording integrated systematic classroom observation method. In this integrated method, a video camera is a tool that generates data (Otrell-Cass et al., 2010). The recorded videos were transferred into two Transcend External Hard Drives with a capacity of 1TB at the end of each day to back up the data. The technical rules developed for video recording were strictly followed. The set of rules has been given in [Appendix B](#). Altogether 147 videos on classroom teaching were collected. It took nearly five months from October 2021 to March 2022.

Replacement of sample schools. In systematic research, a plan is obvious for the certainty of research activities. However, the logical plan rarely functions exactly in the complex context of the natural setting. In the plan, there were N=14 sample schools for 14 science classes and 14 social studies classes. The field experience of this researcher informs that the context is beyond the control of a researcher and ethically he is not allowed to manipulate the context. The researcher's plan could not work as intended. In the case of two schools, out of the planned four-teen sample schools, the classroom video recording observation was not permitted. So, the two planned sample schools and their incomplete raw data were discarded from the dataset. Later, the data were replaced with other two schools' data selected from the list of randomly assigned schools following the random numbers.

Selection of valid videos. Out of 147 videos 118 were selected as valid videos. Among them, 54 out of 69 videos in science and 64 out of 78 videos in social studies were selected as valid videos to code and process data. The remaining 15 videos were discarded in science and similarly 14 in social studies. The 27 videos recorded on the first days, one from each sample school, were discarded according to the general rule of classroom observation research. Because it is thought that the first-day observation or video recording creates unusual instructional behaviors that weaken the reliability and validity of the data. The other two videos of two days' science classes were discarded since these were from an incomplete cycle of observation, and there was a plan to observe a minimum four-day long continuous observations on official curriculum lessons for each subject in this research.

Valid session. A total of 147 class sessions were recorded. Out of them, 118 had been selected as valid session videos and were undertaken for time calculation and encoding. The school teachers had a weekly routine/classroom teaching routine for 40 minutes in the official plan. The classroom research shows that the valid session executed by the teacher and student is 33 min and 12 sec. **or** 1992.076 sec in aggregate. Subject-wise, in the social studies classroom, it is 32 min and 11 sec time and, in science, 34 min and 17 sec time. This session is thought of as an enactment of the official curriculum. In this research, this session span stretched from the point of the teacher's formal opening of that day's instruction by stating lesson-related information, directly announcing the topic, asking questions to the student, writing the topic on board, etc. to the point of formally closing the lesson teaching by the teacher stating its end, or leaving the classroom.

Classroom Video Encoding

Video encoding is a continuum of systematic classroom observation activities. It is the process of assigning a categorical number to the activities. The video contents represent the live classroom activities in the video record. The classroom video encoding carried out in this research for quantitative analysis is a data-generating process and at the same time, it is regarded as data entry. Both forms of data generation, by encoding the videos and the data entry in SPSS v20, were performed with computer software assistance. In the process of data generating, a particular video had to be played, observed the onset approximately for five seconds with a mental process about a behavior category decision, stopped after the interval, and encoded the video with a behavior category or replayed video interval if ambiguity persists. In such cases, replaying the exact interval, if needed, is not possible without computer assistance (Yoder & Symons, 2010). Furthermore, to identify and reduce encoding errors, this observer set up a system of Coding Tracker against the variable code entries in the SPSS. The coding tracker was not used for any statistical operation but has played a role in establishing the reliability of the data coding and entry by keeping the process on track maintaining parallel to video time. The initial and terminal points of time of the coding tracker indicate the session started and ended. Hence, the coding tracker was also used as a verification measure in calculating a valid video time.

Simultaneously, another side of the encoding is data entry. The video encoding was not performed with paper and pencil. Rather the data was directly entered into the SPSS v20 software installed on the laptop computer. Before entering the data from the collected videos, the activity categories of science and

social studies involved in each classroom observation were defined in the Variable View in SPSS v20. In doing so, the case variables parameters like name, types, labels, values, and the measures were changed with school-subject-teacher-date-class observed times (i.e. C28124SSStSKC_20220403_Obs1), numeric, classroom activity categories of the teacher on the day elaborating the name, numerical representation from 1 to 11 of the activity categories, and nominal measure respectively. The categories portrayed by the SPSS v20 Data Sheet are given in [Appendix K](#). A coding tracker was provisioned for each case to track the error of data entry in every five-second interval which was expected to function as a controlling mechanism over the observer drift in encoding a video. Encoding the categories of instructional behaviors recorded in the videos every five-second is the unit of observation. Each code represents a category of the target activities/behaviors like; 1. laboratory experiences: opened, 2. laboratory experiences: structured, 3. group project, 4. student demonstrations, 5. student library research, reporting, etc., 6. student speaking, 7. teacher questioning, 8. workbook work, 9. teacher demonstrations, 10. lecture, and 11. general havoc in science. Similarly, in the case of social studies, it includes the individual practical activities category and excludes the laboratory experiences category.

The video coding is based on the manual given in [Appendix B](#), which contains ACI variables and their descriptions, ground rules, and technical rules. A standard observation form that was already tested in classroom contexts of Nepal in measuring classroom behavior categories was used to encode the video of classroom behavior. This researcher is convinced by the advantages excerpted by Gall et al. (2003) in using the standard observation form developed and used by other researchers. As they

have claimed, such forms have explicit evidence of validity and reliability; and can ensure the comparability of the later research findings with previous findings. For this purpose, the form was used in this study. However, the disadvantage of such a form of not responding to the newly evolved activity variables (Gall et al., 2003) has been reduced by incorporating an ICT activity variable as a subcategory into the ACI instrument. However, ICT-using behavior was not found during the observation.

The SPSS v20 software system was used for encoding the behavior activities from the 133 videotaped classroom sessions of the science and social studies teachers. In every five seconds, one of the instructional behavior categories was assigned with a categorical number based on ACI. That is, each variable is represented by a coding number that has no additive value, or ordinal value. Hence, as per the definition of variables, the classroom activities recorded in videos were coded into the SPSS data sheet following the ACI coding ground rules and technical rules.

From the encoded videos, frequencies of the five-second time intervals and the time occupied by each behavior category were calculated in Excel. Then, based on the time calculated from the recorded video observation, data entry was made for further statistical analysis. Before the main data analysis process, the consistency of the coding behavior of the researcher on the instructional variables was measured with an intra-rater reliability test.

Intra-rater Reliability Test. Intra-coder reliability estimates the consistency of the coder task in encoding the videos. It identifies whether the coding process is free from observer drift and subjectivity, or not during the encoding of 118 videos of classroom instructional sessions (See [Appendix O](#)). Talking about the total time, the instructional behaviors that occurred in 235,065 seconds were coded with the event in every five-second interval. Hence, each

code consists of an event or a category of behavior that prevails in the five-second interval. Thus, this process of coding is a time-taking and lengthy process that can affect the stability of the coding behavior of an observer. The encoder, being a human instrument, might have affected the data coding due to his fatigue, drift, and bias. So, intra-coder reliability was estimated using Cohen's kappa.

Table 2

Indices of Intra-coder Agreement

Videos	Cohen's kappa				Observed Total % Agreement
	Value	Symmetric Measures		Approx. Sig.	
		Asymp. Std. Error	Approx. T.		
C28207SSStKD_Obs2	.51	.04	16.74	.00	77%
C28207SciBT_Obs2	.26	.05	6.95	.00	60%
I28202SSStBCG_Obs4	.34	.04	9.9	.00	57%
C28124SSStSKC_Obs2	.44	.09	10.95	.00	93%
I28183SSStSL_Obs4	.44	.03	14.25	.00	61%
I28083SciSP_Obs4	.45	.09	13.4	.00	92%
I28125SciRSK_Obs2	.54	.050	14.307	.00	79%

For the Kappa test, six percent of videos were sampled. In number, there were seven video sessions randomly selected from already coded classroom videos by using the "Random Name Picker" online tool to check intra-coder consistency. The time gap between the first coding and the second was more than two weeks but did not exceed more than forty-five days in the case of the former five video codings. However, the latter coding had been in the five-month time gap between the two coding tasks. This time gap was necessary to avoid the effect of the first coding memory on the second time coding of the same video.

The videos had been randomly selected to reduce coder bias. In this way, seven selected videos for recoding were I28183SSStSL_Obs4, I28202SSStBCG_Obs4, C28207SSStKD_Obs2, C28207SciBT_Obs2, C28094SSStRSK_Obs2, C28124SSStSKC_Obs2, and I28083SciSP_Obs4. The complex symbol used for videos is read as community/institutional school, school code number, name of the subject, the teacher's name in short form, underscore, date of the observation, underscore, and class observation day or session count. The initially video-encoded datasets, which were in the SPSS v20 data sheets, and the code datasets obtained from the second time encoding of the same videos had been run for intracoder consistency employing Cohen's Kappa. The result of intra-coder consistency is given in Table 3.

The Kappa values on the seven videos' intra-coder consistency were found significantly high. In Table 3, the Kappa result shows the observer drift ranging from .259 to .532 which is the agreement not by chance (Bakeman & Quera, 2011) that exists as real agreement. This range of values informs that the degree of consistency falls between fair and moderate. But, the observed total percentage agreement without reducing the chance agreement percentage, ranged from 57% to 93%. It shows higher than the statistics in Kappa. This ranges from moderate to almost perfect similarity. It is, because, Cohen's Kappa corrects for agreement due to chance which shows lower than the total percentage agreement or observed total percentage agreement which makes it preferable to percentage agreement (Bakeman & Quera, 2011). In this way, the total percentage of the agreement between this researcher's coding works indicates the degree of intra-coder consistency which reflects reliability in the coding work.

Sequential Transition From Quantitative to Qualitative Research.

Instructional behavior is a complex layered endeavor that requires a sequential procedure to reach the underneath of the holistic phenomenon. In this context, the sequential explanatory mixed methods design, followed in the present research, seeks consecutive relationships between the two methodologies in practice, explicitly stating from quantitative to qualitative methodology. This tells the researcher to perform quantitative data collection and analysis first and then qualitative data collection and analysis, in a sequential manner allowing to construct meaning of instructional behavior in practice in the complex systems' context.

Procedurally, in the first phase, this researcher completed quantitative data collection and analysis which consists of descriptive and inferential results. The quantitative research results could not have answered research questions like Why did not the time of students speaking scale up significantly despite the intent of the instructional system at policy, education, and discourse levels? Why do student activity categories take place very rarely or none in classrooms? What are the dynamics that determine the instructional behaviors in the classroom? How do they play a role in classroom dynamism? etc. Rather they stimulated to conduct further research by employing soft technique. In this way, these questions concerning the quantitative results bridged with consecutive qualitative research to answer the 'Why' and 'How' research questions. The design logic entering the second phase allowed the researcher to employ the qualitative data collection relying directly on the quantitative results like the extreme or unique cases derived from the descriptive statistical operation and significant results, or insignificant results of the inferential statistics (Creswell & Creswell, 2018) on the behavioral categories. The purposes of

qualitative research were, for Morse (1991) to examine unexpected results; for Bowen et al. (2017) to find out personal experiences and knowledge, and for lived experience. Hence, qualitative research found a firm rational ground in the results of quantitative analysis for the sake of digging out the deeply laid professionally perceived experiences. Then, the themes were generated with the support of the specialized computer software-NVivo, to explore the interface between instructional behavior and instructional systemic dynamics.

Sampling strategy. Among the variants of purposeful sampling, a complex dynamic systems sampling strategy was adapted in this qualitative phase. It involves selecting cases where complex dynamic processes can be tracked and studied over time (Patton, 2015). The participants for the second phase of research were selected from those cases that were found with unique values in quantitative results on notebook work, teacher lecturing, and student speaking behaviors. These cases are the representative problems of the instructional behavioral states caused by the complex systemic interaction reflecting uncertainty and unpredictability. Therefore, the cases were selected through purposive judgmental sampling which tends to have deep and wide information related to the multilateral and multilayered instructional systemic interactions and influences.

Creswell and Creswell (2018) stated that the quantitative results typically inform the types of participants to be purposefully selected for the qualitative research phase who possess intersecting information on instructional policies, layered systems and interactions, professional parameters and procedures, and student learning contexts. It is also known as judgmental sampling.

Research participants. The teacher is the main actor in the classroom who has lively experienced and interacted with instructional systemic dynamics. S/he is

regarded as a change agent (Cooper et al., 2015; Lukacs & Galluzzo, 2014), has professional career development (internal); historical and current instructional policy and system (external); and events in everyday life (personal) critical incidents perceived across the classroom life (Measor, 1985). Hence, realizing the conceptual ground, this researcher selected the teachers who would be valid research participants for this qualitative research. They are rich sources of information about why the instructional behavior changed or not and how instructional dynamics play a role in classroom instructional practice.

Sample size and characteristics of the samples. Based on the statistical results, I worked with the four research participants (N=4) as key informants who represent extreme values of the amount of time spent in class, school category, and social studies and science subjects. For this qualitative research, a purposeful sampling process was followed to select research participants from among the samples used for the quantitative research. Table 2 sums up the basic characteristics of the four teachers relevant to this study as research participants. Stating categorically, the first case, research participant or sample C28027SciPMB, was the case which represents the classroom with the highest time occupation for student speaking behavior with 19.01%, community school system, located at the mid-city, weak infrastructure, and students with very weak economic background. The second case, C28207SStKD, was sampled to represent the social studies classroom with the lowest time occupation in teacher lecturing behavior with 50.20%, a community school system, well-developed and equipped infrastructure, a school located on the outskirts of the city, and students from the local community with diverse ethnic groups. The third case, C28027SStMPN, was selected to represent the classroom with the highest teacher lecturing behavior with 91.43%, a community school system

with weak infrastructure, a school located in the mid-city, and students with very weak socio-economic backgrounds. Likewise, the fourth or last case, I28202SSStBCG, was selected to represent classrooms with a high preference for notebook work, which was 37.15% of the time, an institutional school system, equipped school infrastructure, students from sophisticated family background, and a school located in the urbanizing area.

Table 3

Basic Characteristics of Research Participants (Teachers)

Research participant	Instructional behavior	School system	Education	Teaching career
C28027SciPMB	preferring the student speaking (19.01%)	located in mid-city, with very weak infrastructure, and very weak students' background.	BSc in Biology One year BEd, trained	science teacher with 29 years' experience, permanent status
C28207SSStKD	limiting the lecturing (50.20%)	well-equipped infrastructure, located on the outskirts of the city, students of the locality	BEd in English, trained	social studies teacher with 11 years experience, permanent status
C28027SSStMPN	preferring the lecturing (91.43%)	located in mid-city, with very weak infrastructure, very weak student background	MA in Sociology, trained	social studies teacher with 24 years experience, permanent status
I28202SSStBCG	emphasizing on the notebook work (37.15%)	equipped infrastructure, students from sophisticated backgrounds, and urban location	BA in English and sociology, and trained	social studies teacher with 20 years' experience

In this way, the characteristics of the research participants given in Table 2 have validated qualitative research to explore the causes and explain the quantitative results. The qualitative information obtaining from the research participants are comprehensive in nature.

Narrative interview. The narrative interview method was used for qualitative information collection from research participants. It is a powerful method to generate holistic information. The principal attraction of narrative as a method is its capacity to

render lived life experiences not only personal and social (Clandinin & Connelly, 1989), but also educational and professional life experiences. The method renders an enjoyable environment for research participants to tell their own life stories comprising all dimensions that come across life living. The assumption of this interview approach is that the story of a teacher is constructed through life experiences of the world of life. This includes the past and presents important events, experiences, and feelings of the participant shedding light on the future life (Kim, 2016). In this research, the core information of the narration being shared by the teacher is classroom pedagogical behavior. Hence, telling the own life story by the teacher becomes a key process to understanding the complex nature of the classroom (Kim, 2016) and its influence on the teacher's behavior.

The narrative interview that I preferred to use for this research is a deep digging and widely covering qualitative instrument. This instrument is considered a form of an unstructured and in-depth interview with specific features that encourage and stimulate an interviewee to tell accounts of what occurred in life (Jovchelovitch & Bauer, 2000). They, further, assert that people recall what had happened, put the experience into a sequence, find possible explanations for it, and play with the chain of events with references to space, place, and time. The sequence of time in professional life explores the teacher's understanding of the interactive relationship between the past and the present, and even the future (Ådlandsvik, 2012) in classroom behavior dynamism. Thus, the narrative interview is a non-directive, less reactive, and holistic approach to data collection. The types of questions that are planned for the research participants also depend on the quantitative results (Creswell & Creswell, 2018). This research focuses on eliciting the teachers' classroom lives and behavior with the systemic dynamics through their narratives. The narrative interview is used

to elicit deeply embedded perceptual and experiential holistic information on a complex interaction of their personal and professional agencies, classroom teaching behavior, and instructional systemic dynamics.

Narrative interviewing is a collaborative process of interviewer and interviewee or researcher and research participant (Clandinin & Connelly, 1989; Connelly & Clandinin, 1990; Kim, 2016; Webster & Mertova, 2007). Generally, narrative interviewing consists of open-ended and non-leading questions (Esin, 2011) or an interview guide. Participant-focused this interview took place with different degrees of collaboration between the researcher and research participant as it moved into the phases of the interview process. Trust and rapport building between the researcher and research participant was the foremost phase of the collaborative venture to move to the further phases. Hence, this interview was undertaken as suggested by Kim (2016) to have main two phases: the narration phase and the conversation phase. In the first phase of the interview, the narration phase, teachers were encouraged to narrate their perceived events, lived experiences, and beliefs that had been built into their professional lives. During this phase, teachers or research participants narrated their lived stories experienced in every walk of life of becoming and being a teacher, responding to open-ended interview contents set in the narrative interview schedule. My role, as an inquirer during this phase, was to be an appreciator, active listener, observer, information collector, analyzer, and manager. The second phase of the narrative interview was the conversation phase in which both the researcher and research participant engaged themselves in identifying the remaining dimensions of the life story and generating information through collaborative interaction. The role of the inquirer in this phase was to ask semi-structured and in-depth interview questions to generate additional information on

uncovered dimensions and to get clarity on the confusing information contained in the narration. Hence, the interview flowed through narration to the conversation phases. The narrative Interview Guide given in [Appendix R](#) is the instrument that depicts the phases and rules or aspects (Jovchelovitch & Bauer, 2000) of narrative information to be covered in the interview process.

In conclusion, the activities followed during the interview were: firstly, consent taking and rapport building with research participants through an informal conversation about ethics, purpose, and key aspects of narrative interviewing; secondly, the narration of the research participant's life story based on lived experiences flowed spontaneously without a frequent and an unnecessary interruption by the interviewer; thirdly, a conversation between researcher and participant for uncovered events and aspects and for more in-depth feelings, understanding, and perspectives, and lastly, the researcher closing the course of interviewing with grateful words for their cooperation, and with a commitment to have contact again, if needed.

Quality of narrative information. In this narrative interview, I was well-inclined with quality information generation. To maintain the quality of the research findings, I applied the quality criteria for qualitative data collection rigorously to capture the actual information that could represent the teachers' perceived and lived experiences of their professional lives. In this regard, attention was paid to burrowing into the causal information of instructional behavior (Connelly & Clandinin, 1990). The quality position of my qualitative research is aligned with the trustworthiness developed by Guba (1981) and Lincoln and Guba (1986) parallel to quantitative research quality criteria. The measuring criteria for trustworthiness are credibility, transferability, dependability, and conformability which directly correspond to

internal validity, external validity, reliability, and objectivity respectively. The narrative interview with the research participants was the second research activity. Before this, I had conducted one week-long classroom teaching observation with their consent. At that time, I had communicated with them about this informal conversation (narrative interview) which would take place after a few months. Frequent phone conversations with the research participants also happened. I also informed them about the research ethics to be maintained by the researcher. The research participants were excited about my classroom research as a part of my Ph.D. study and committed to supporting my research work. I perceived they, as teachers, were also very much interested in sharing their pain, pleasure, satisfaction, dissatisfaction, etc. Furthermore, the interview time and place were also conformed with their consensus. They were interested in hearing their interview audio and requested me to email the audio clips to them. This situation shows a prolonged engagement with research participants and their trustworthy relationship with this researcher which ensures the credibility of the narrative interview findings. Purposively sampled distinct cases are regarded as potent information sources for the applicability or generalizability of the research findings (Patton, 2015). The interviewees selected for narrative interviews for the second phase of research are derived from unique values or distinct cases in terms of lecturing, students speaking, and notebook work classroom activity time. The quality concept concerning dependability in qualitative research signifies a systematic process to yield the research findings. So, its focus was "on the process of the inquiry and the inquirer's responsibility for ensuring that the process was logical, traceable, and documented" (Patton, 2015, p. 990). Dependability or reliability, for this narrative data process, implies two forms of consistency: data consistency and process consistency. From the view of the former type of consistency, the narrative

data elicited from the research participants seemed consistent with each other. Similarly, from the perspective of process consistency, the narrative interviews were recorded into the audio device which was then transcribed, coded with NVivo software, and transformed into an analysis report to draw findings/conclusions sequentially. Hence, these consistencies reveal the process dependability that ensures trustworthiness. I audio-recorded the narrative accounts expressed by the research participants.

The recorded data are stable, so they are readily accessible to concerned scholars or researchers. The narrative data and findings incorporated in this research are with the minimized researcher's value influence and away from fabrication and distortion which ensures the confirmability towards meeting the trustworthiness. Moreover, the findings drawn from the teachers' lived experiences and perceptions have a naturalistic ontological authenticity which comprises the inductive, grounded, and creative process (Lincoln & Guba, 1986). Hence, the findings of this qualitative research using narrative interviews have ensured the quality of trustworthiness and authenticity.

Contents in the narrative interview. The quantitative results of the first phase study shaped the types of interview questions (Creswell & Creswell, 2018) to be asked in the second phase of research and their contents. The contents of the narrative interview were derived from the contents of variables studied in the quantitative research, and the conceptual framework of this dissertation problem is given in the literature review chapter. Hence, the focused contents in the second phase were, in general, classroom instructional behavior and the change that occurred over time of professional life, and their interactive relation with teacher's pedagogical content knowledge/skill and instructional activities and with the systems, curricular

materials, pedagogical theory, and approaches as well. Shelton's chronosystem implies the following aspects to contain in the narrative interview which intersect with the teacher's professional development belonging to micro, meso, exo-, and macrosystems as inevitable dynamics (Shelton, 2018) to the teacher's instructional behavior in the passage of past, present, and future time. The contents contained in the narrative interview are- early life (the early life in a family, teachers' classroom teaching in the school life); becoming a teacher (college study life interaction with faculty, subject, theory, and practical, acquisition of content knowledge and skill/ content pedagogical knowledge and skill); career assumptions and plans (motivation, choice, efforts, achievements); and being a teacher (entering the professional life, perceived change in the professional life, determinants of classroom instructional behaviors, everyday classroom activities and their relation with college, training and professional program, and curricular materials, pain, and pleasure, or satisfactions and dissatisfactions on school and classroom activities, transformation, and accomplishments, everyday life).

Data Processing

The data obtained through two distinct types of methods of the two different phases of research were analyzed with two approaches. The analysis was based on the nature of the variable and data. In the first quantitative phase, the instructional behavior being dealt with is a dependent nominal variable. In behavioral science, ratio scales are used when variables involve physical measures, particularly time measures such as interval and duration of response (Cozby & Bates, 2018). The category system instruments use time intervals to measure instructional behaviors. Through the ACI system, nominal measurement data as well as ratio data are obtained. The code entered at the nominal scale represents the ratio scale since the behavior categories are

assigned every five-second time interval. The code is represented by the nominal number. In this system, the researcher had a number from 1 to 11 categories for instructional behaviors in science and 2 to 11 categories in social studies to assign code. The frequency of a behavior category code gives an interval of the particular behavior. Hence, the frequency of behaviors calculated from nominal values is treated at a ratio scale of measurement (Cozby & Bates, 2018). The quantitative data of instructional behaviors were analyzed using Excel-2019 and SPSS v20. It involved video coding, valid classroom time calculation, calculation of average time on each variable of each teacher, operation of descriptive statistics, and inferential statistics which are given in [Chapter Four](#).

In the second qualitative phase, the covert or sedimented behavior was analyzed. The qualitative data were planned to be obtained through narrative interviews. The analysis of narrative data, also known as paradigmatic analysis (Polkinghorne, 1995), was performed in different analytical works subsequently. It involved transcribing interview narratives, coding (open-labeling in the chunk of data; axial-, the relationship of open codes; and selective-establishment of relationship with the main theme) the narratives, generating themes, and reorganizing the information into texts or developing meaning which are included in [Chapter Five](#) of this dissertation. In the narrative analysis, the temporal and unfolding dimensions of human experience were attended by organizing the events of the data along with a before-after continuum and integrating notions of human purposes and choices, chances of happenings, dispositions, and environmental pressures.

In conclusion, as argued by Polkinghorne (1995), analysis of narratives moved from stories to common elements, and narrative analysis moved back from elements to stories of participants, i.e., teachers and head teachers. It was a qualitative analysis

of the behaviors triangulating the data obtained from the different participants representing extreme value cases.

At last, the findings from both quantitative and qualitative analyses have been integrated into the comprehensive discussion in [Chapter Six](#) of this dissertation for a making meaning, drawing conclusions, or theorizing the classroom instructional behavior.

Ethical Considerations

In human subject research, the ethical issues to be maintained by the researcher are highly concerned with quality research. Webster and Mertova (2007) and Cohen et al. (2018) suggest the following ethics that concern all aspects of the research from the development of the title to the result dissemination. The ethics and confidentiality adopted in this research have been given in [Appendix B](#).

- In the research, the researcher avoided sponsorship and power influences and controls that could happen from any agency and human subjects.
- The research activities were carried out as per ethical codes and guidelines provisioned by the research ethics committee of the Faculty of Education, Tribhuvan University. Considering ethics in research, the researcher had received an authorization letter from the Graduate School of Education, Tribhuvan University, to conduct classroom research. (see Appendix C)
- Field research works were initiated along with the informed consent of the gatekeeper and participants of the sites. They were informed about the purpose and process of the study.
- Throughout the research process and reporting, human dignity and privacy were honored maintaining anonymity and confidentiality.

- The researcher's honesty and trustworthiness were maintained in data collection which also contributed to research quality.
- An interesting ethical dilemma in the research was that the school authority was found to be so supportive of granting classroom observation in the researcher's comfortable time by changing the official usual routine. This would make data collection easier but it could be a serious validity deterioration if the facility was followed.
- This researcher frequently faced ethical challenges of capturing the classroom activity data with digital devices not of a single session or day, of nearly a week long. Since the classroom sessions are assigned only to students and teachers, other people are restricted from entering the class. However, the challenges were carefully and consciously tackled, and the process followed to tackle has been explicitly mentioned in the previous section under quantitative methodological phase.

Chapter Four

Dynamism of Classroom Behavior: The Changes Undergone

This chapter seeks to answer RQ1 and RQ2 revealing the instructional behavior status, that is, in the present classroom and the change that happened in comparison to the past classroom. The concept of dynamism in this dissertation is used to refer to the change occurring in classroom behavior. This chapter has dealt with classroom behavior quantitatively comparing the past and present Grade 9 teachers and students in science and social studies subjects. Hence the behavioral evidences are presented and established (Clare, 2004) in this chapter.

Categorically, ten instructional behavior variables/activities specified in ACI are individually compared correspondingly. Classroom teaching is a behavioral phenomenon practiced by the teacher (Day et al., 2007) which was observed by this researcher. The time interval classroom observation allowed the researcher to derive both frequencies (discrete responses) and duration (continuous responses) (Lammers & Badia, 2005) data for descriptive statistics and inferential statistics. The Excel 2019 and SPSS v20 versions were used for the statistical analysis of the dataset.

Present Status of Instructional Behavior

Instructional behavior in the classroom process signifies the engagement of teacher and student intersecting their teaching and learning acts purposefully. This is an enactment process of authentic curricula. The instructional behavior represents the content information on one hand and instructional activities on the other hand. It has reflected the PCK blending content and pedagogy knowledge for classroom teaching behavior (Shulman, 1987). Among the subject areas taught in grade 9, science and social studies were selected for this research. These two subjects' nature, structure, and focus of knowledge are not similar. The science subject requires laboratory

activities and observation, whereas, for social studies, they are not necessary. So, to measure instructional variables in these subjects, ACI science and ACI social studies tools were used to encode behavioral evidences. These tools are different in one aspect that is laboratory work. The categories of classroom instructional behavior were measured based on a time-event interval using the ACI instrument.

Classroom behavior in science. Classroom behavior in science teaching intends to explore how science teachers process the body of scientific knowledge, that is, recommended in the science subject curriculum. For Bell (2009), effective science instruction requires explicit instruction to be its central concern and its goal is to give scientific literacy familiarizing with scientific methods. The subject curriculum and TG developed by the CDC, Nepal, suggest the integration of lecture, question-answer, demonstration, experimentation, discussion, field study, and project work instructional activities (CDC, 2014) into everyday instructional behavior. These behaviors were measured with ACI variables- laboratory use, group work, project work, student demonstration and presentation, student library research, field trip and reporting, student speaking, teacher questioning, notebook work, teacher demonstration, and teacher lecturing. There were 13 school science teachers' 54 sessions and teaching lessons were recorded and encoded. The curriculum content, observed contents, and video references are given in [Appendix P](#). 70% of content areas of the science curriculum were representatively recorded and encoded. Hence, the behavioral data presented in Table 4 represent the classroom behavior that prevailed throughout the academic session. The table also shows the time spent in the instructional behavior categories in the classroom of individual teachers. The table presents the time spent on the general instructional activity categories by a school teacher and students in the science classrooms. The instructional behavior measured

in the time unit has been represented in percentage. The data in the table show that teacher lecturing is the dominant behavior in science education classrooms.

Table 4

Activity Occurred Time in Classroom of Science Teachers in Grade 9 (Time in Percentage)

Teachers	Instructional Behavior Categories* and Percentage of Time Occupation										
	1	2	3	4	5	6	7	8	9	10	11
C28027SciPMB	.00	.00	.00	.00	.00	19.01	1.44	13.55	1.76	59.27	4.97
C28014SciPG	.00	.00	.00	.00	.00	6.15	7.30	16.09	.00	66.17	4.29
C28094SciKPS	.00	.00	.00	0.57	.00	12.23	5.52	2.76	0.42	75.74	2.76
C28207SciBT	.00	.00	.00	.00	.00	5.06	.91	4.87	3.64	79.16	6.36
C28124SciRL	.00	.00	.00	27.1	.00	5.86	3.75	2.35	0.13	47.33	13.48
C28204SciSBR	.00	.00	.00	.00	.00	6.23	3.81	10.36	.00	68.60	11.00
I28145SciST	.00	.00	.00	.00	.00	7.45	5.94	21.26	.00	63.01	2.34
I28125SciRSK	.00	.00	.00	7.82	.00	5.64	3.68	18.69	.00	61.41	2.76
I28083SciSP	.00	.00	.00	.00	.00	3.97	2.82	4.66	.00	87.69	0.86
I28047SciNM	.00	.00	.00	.00	.00	4.53	0.67	8.38	.00	77.37	9.05
I28183SciSB	.00	.00	13.36	.00	.00	11.48	0.61	29.74	2.69	38.31	3.81
I28149SciTPA	.00	0.96	.00	.00	.00	1.93	1.93	4.68	3.08	84.44	2.98
I28202SciSCG	.00	.00	.00	.00	.00	6.17	3.29	5.91	0.12	83.16	1.35

(*Categories. 1= Laboratory (open) Using, 2= Laboratory (structured) Using, 3= GroupWork/Project, 4= Student Demonstration and Presentation, 5=Student Library and Field Trip Reporting, 6= Student Speaking, 7= Teacher Questioning, 8= Engaging in Notebook work, 9=Teacher Demonstrating Activities and Using Audio-Visual, 10= Teacher Lecturing, 11= Silence and Havoc)

Table 4 also depicts that the instructional behavior of laboratory (open) and student library research and field-trip reporting did not occur in the classrooms. The laboratory work (structured) and group work or project work are in practice in only two school classrooms and the student demonstrations and presentations were found in three school classrooms out of the thirteen. Likewise, the teacher's class demonstration activities and use of audio-visual materials were found to be enacted in

seven school classrooms out of the thirteen school classrooms. In conclusion, the pedagogical behaviors that prefer student learning based on hands-on activities like laboratory work, group or project work, library research, and field trip reporting did not exist in the science subject classrooms. Hence, the data reflecting the science teachers' classroom informs that the school science education is being practiced as talking about science rather than doing science (Kang & Wallace, 2005) across the school classrooms regardless of their institutional and community categories. If the students do not get field trip opportunities for science education, they are deprived of direct experience of science in nature and discovering and exploring new information to integrate them (Ezechi, 2018) into formal knowledge. However, the Nepalese case is not exceptional, as Ezechi (2018) also found science teachers in Nigeria do not practice field trips in teaching-learning except in very few cases.

Table 5

Mean and Standard Deviation of Behavioral Categories in Science

Class (Time in Percentage)

Instructional Behavior Categories	N	Range	Min	Max	Mean %	SD
Laboratory(open) Use	13	.00	.00	.00	.00	.00
Laboratory(structured) Use	13	.96	.00	.96	.07	.27
Group Work/Project	13	13.36	.00	13.36	1.03	3.70
Student Demo and Presentation	13	27.10	.00	27.10	2.73	7.63
Student Library and Field Trip	13	.00	.00	.00	.00	.000
Student Speaking	13	17.08	1.93	19.01	7.36	4.47
Teacher Questioning	13	6.69	.61	7.30	3.20	2.11
Note Bookwork	13	27.39	2.35	29.74	11.02	8.37
Demo. and Audio-Visu, Use	13	3.64	.00	3.64	.910	1.3
Teacher Lecturing	13	49.38	38.31	87.69	68.60	14.76
Silence and Havoc	13	12.62	.86	13.48	5.08	3.87

The intended instructional behaviors are lecture, question-answer, problem-solving, observation, role play, experimentation, inductive inquiry, demonstration,

discussion, discovery, project, field trip, case study, and critical thinking (CDC,2014). As depicted in Table 5, the observed instructional behavior data inform that lecturing, teacher questioning, student speaking, and notebook work in all classrooms; experimentation (structured), group project work, demonstration and presentation, and teacher demonstration in only a few school classrooms, and the rest activities none in practice. In this way, the same instructional policy intents were found to occupy differently in classroom practice in terms of the amount of time and selection of a category of activities. ,

Normality test of the data distribution in science. The normality of data distribution is one basic assumption for a one-sample t-test. The dataset violating normality gives statistical results with weak validity. Before running the t-test, the dataset on science teaching behavior was checked for its normality through the Shapiro-Wilk test.

Table 6

Normality Test of the Data in Science Subject

Instructional Behavior Categories	Kolmogorov-Smirnov			Shapiro-Wilk		
	Stat	df	Sig.	Stat	df	Sig.
Laboratory (structured)	.532	13	p<.001	.311	13	p<.001
Group Work/Project	.532	13	p<.001	.311	13	p<.001
Student Demo., Presentation	.440	13	p<.001	.362	13	p<.001
Student Speaking	.266	13	.012	.878	13	.066
Teacher Questioning	.157	13	.200*	.937	13	.414
Notebook work	.191	13	.200*	.889	13	.095
Demo. Audio-Visual, ICT	.332	13	p<.001	.703	13	p<.001
Lecturing	.148	13	.200*	.945	13	.525
Silence and Havoc	.203	13	.145	.872	13	.056

Ahad et al. (2011) found that the "Shapiro-Wilk test is the best normality test because this test rejects the null hypothesis at the smallest sample size compared to the other tests, for all levels of skewness and kurtosis of these distributions" (p.637).

This was specifically stated by Shapiro and Wilk (1965) that this test is for a sample size from 3 to 50.

However, the Kolmogorov-Smirnov test is also observed for the cross-validation of the result of the Shapiro-Wilk test. Having a statistically significant value (p) greater than .05 in the Shapiro-Wilk test is recommended for the t-test. In Table 6, the results of the Shapiro-Wilk test yielded information that the laboratory values (structured) use, group work/project work, student demonstration and presentation, and teacher demonstration, and audio-visual and ICT tool instructional behaviors of the population are not normally distributed, since the significant values are less than $<.05$ or ($p<.05$). So, for these variables, the t-test is not applicable to compare the means. On the other hand, the variable values related to student speaking, teacher questioning, notebook work, and lecturing instructional behavior of the study population are more than value .05. Statistically, these tell (us) that the variable values are normally distributed. The test results allow us to run a t-test on the variable values.

Classroom behavioral state in social studies. There were fourteen schools randomly selected for social studies classroom recording observation. Altogether 64 videos or class sessions of social studies teachers were collected to encode and analyze the classroom instructional behavior. This number of lesson-session videos recorded covered 47% of lessons out of 51 content areas of the social studies curriculum (see [Appendix Q](#)). The classroom activities of a teacher were continuously recorded for four to seven days. Hence, the video data have representatively covered the classroom instructional behavior of social studies teachers that they enact in every classroom. Prespecified instructional activity categories and the occurrence time of each activity category were the concerns of the observation. The instructional variables of interest were individual practical activities, group work, project works,

student demonstration and presentation, student library research, field trip and reporting, student speaking, teacher questioning, notebook work, teacher demonstration, and teacher lecturing.

Table 7

Activity Occurred Time in Classroom of Social Studies Teachers in Grade 9

(Time in Percentage)

Teacher	Instructional Behavior Categories* and Percentage of Time Occupation										
	2	3	4	5	6	7	8	9	10	11	
C28124SSStSKC	.00	.00	.00	.00	8.18	1.41	.00	.00	85.53	4.88	
C28204SSStMT	3.17	10.85	2.78	.00	4.40	1.34	.00	.00	77.46	.00	
C28027SSStMPN	.00	.00	.00	.00	2.89	0.81	.00	1.27	91.43	3.60	
C28014SSStJP	.00	.00	.00	.00	8.34	4.30	.00	.00	77.31	10.05	
C28199SSStLSS	.00	.00	6.50	.00	4.74	2.13	7.22	.00	71.00	8.41	
C28094SSStRSK	.00	.00	.00	.00	5.25	4.88	11.13	8.99	62.81	6.94	
C28207SSStKD	.00	7.33	3.27	.00	5.24	4.38	20.83	.00	50.2	8.75	
I28145SSStARB	.00	.00	.00	.00	3.62	1.64	.00	.00	81.59	13.15	
I28125SSStGBK	.00	.00	.00	.00	8.51	3.40	2.32	.00	85.03	0.74	
I28083SSStSA	.00	.00	.00	.00	3.28	2.91	9.28	.00	80.01	4.52	
I28047SSStCKR	.00	.00	.00	.00	2.99	1.36	4.99	.00	89.40	1.26	
I28183SSStSL	.00	.00	.00	.00	7.86	2.44	11.90	.00	72.20	5.60	
I28149SSStBC	.00	.00	.00	.00	14.74	4.44	.00	.00	80.18	0.64	
I28202SSStBCG	.00	.00	.00	.00	4.10	2.60	37.15	.00	51.72	4.43	

(*Categories: 2= Ind. Pr. Activities, 3= Group Work/Project, 4= Student Demonstration and Presentation, 5=Student Library and Field Trip Reporting, 6= Student Speaking, 7= Teacher Questioning, 8= Note Bookwork, 9=TeacherDemonstrating Activities and Using Audio-Visual, 10= Teacher Lecturing, 11= Silence and Havoc)

Table 7 presents the instructional behavior that prevailed in the classrooms of 14 social studies teachers. The obtained data from the teachers' classrooms show that there was no activity of students performing library research and field trip reporting in the classroom to integrate the knowledge with official knowledge, as found by Apple (2014), or planned curriculum contents (Marsh & Willis, 1999). Similarly, some instructional behaviors, that stimulate students' active learning behavior, were present in very few school classrooms. Likewise, individual practical activity was in practice

in only one school classroom. Group work or projects; student demonstrations and presentations; and teacher demonstrations, audio-video, and ICT use were found only in two classrooms out of fourteen school classrooms. Among these school classrooms, one school classroom shows the instruction activity integrating ICT tools. Student speaking or questioning and teacher questioning and lecturing are found to be general teaching behaviors across the school classrooms. The lecturing behavior seemed a highly practiced instructional endeavor in all school classrooms. The results show that there were no social studies classrooms spending less than 50.20 % of teaching time on lecturing behavior. This informs that classroom instruction is mostly content information delivered by the teacher that has delimited the students' hands-on, interactive, collaborative, and experiential learning activities.

Table 8

Mean and Standard Deviation of Behavioral Categories in Social Studies

Class (Time in Percentage)

Instructional Behavior Categories	N	Range	Min	Max	Mean %	SD
Individual Practical Activity	14	3.17	.00	3.17	.226	.847
Student Group Work/ Project	14	10.85	.00	10.85	1.298	3.37
Student Demo./ Presentation	14	6.50	.00	6.50	.896	1.95
Student Lib.Res/Field Report	14	.00	.00	.00	.000	.000
Student Speaking	14	11.85	2.89	14.74	6.01	3.25
Teacher Questioning	14	4.07	.81	4.88	2.72	1.36
Note Bookwork	14	37.15	.00	37.15	7.49	10.61
Demo. Audio-Visual	14	8.99	.00	8.99	.7329	2.40
Teacher Lecturing	14	41.23	50.20	91.43	75.42	12.78
Silence and Havoc	14	13.15	.00	13.15	5.21	3.92

Table 8 presents the statistically representative mean value, range, minimum and maximum, and standard deviation of the population data. The descriptive values of the sample inform the current instructional behavior of the teacher and students.

In conclusion, despite emphasizing field trips in the education policy (MOEST, 2019), social studies curriculum, and the pedagogical discourse to transform school classroom instruction, its impact is non on the overt classroom instructional behavior towards strengthening the students' learning. A nearly similar situation was found in individual practical activities; library research; and teacher demonstrations, audio-video, and ICT tool use. As a result, 75.42% of the class time was occupied by the teacher lecturing. And, a very small portion of the time was found being occupied by teacher questioning, a student speaking, and group or project work. This shows that classroom instruction is teacher's behavior dominant or teacher-centered.

In a nutshell, the classroom instructional behaviors in social studies are minimal interaction between teacher and students, low-engaged learning, and rare activity-based regardless of the intents of instructional policy and classroom discourse perspective.

Test of normality of the data distribution in social studies. The test run for normality is a basic prerequisite for a one-sample t-test. The Shapiro-Wilk test is operated to determine whether the datasets are normally distributed. Each variable dataset is tested at the same run.

Table 9

Results of Normality Test of Behavioral Value Distribution

Instructional Behavior Categories	Kolmogorov-Smirnov			Shapiro-Wilk		
	Stat	df	Sig.	Stat	df	Sig.
Individual Pr. Activities	.534	14	p<.001	.297	14	p<.001
Group Work and Project	.507	14	p<.001	.447	14	p<.001
Student Lib. Research	.463	14	p<.001	.543	14	p<.001
Student Speaking	.235	14	.034	.829	14	.012
Teacher Questioning	.163	14	.200	.920	14	.218
Engaging in Note Bookwork	.240	14	.028	.748	14	.001
Demo. and Audio-Visual	.477	14	p<.001	.353	14	p<.001
Teacher Lecturing	.202	14	.128	.900	14	.112
Silence and Havoc	.129	14	.200	.952	14	.597

As shown in Table 9, the Shapiro-Wilk test for normality in social studies informs that the significant values on student individual practical activities, group work and project, student reporting on library research, student speaking, notebook work, and teacher demonstration, audio-visual, and ICT tool are less than, 05 ($p < .05$). This implies t-test is not applicable for these variables, since the dataset of variable values reveals non-normal distribution. However, in the cases of teacher questioning and teacher lecturing, the t-test is applicable since the significant values are $p > .05$.

In conclusion, as the test results portrayed in Tables 6 and 9, the Shapiro-Wilk test for normality indicates the data distribution of three variables in science and two in social studies are normal and the other four behavioral variables in science and six behavioral variables in social studies subject have violated normality assumption. Stating that the significant values on teacher lecturing and teacher questioning behaviors in both science and social studies teaching classrooms, and notebook work using behavior category in science teaching classrooms were found $p > .05$. For these behavior categories, one-sample t-test was recommended. On the other hand, significance test value on laboratory (structured) use in science, individual practical activity, a student speaking, and notebook work in social studies; and group work/project, student demonstration and presentation, teacher demonstration, audio-visual and ICT tool instructional behavior in both subjects were found $p < .05$. These behavior categories were not valid for the t-test.

Data normalization. Data cleaning and normalizing are regarded as prerequisites for a valid test result. The data cleaning associated with data normalization is critical to the validity of quantitative methods (Osborne, 2013). In this statistical analysis, the cleaning started right after the video or data collection, along with the data encoding. It is, as stated by Van den Broeck et al. (2005), a cyclic

process of screening, diagnosing, and treating suspected data abnormalities throughout data processing. The extreme outlier sample value on students speaking in science subjects was winsorized to the closest smaller sample value without affecting the significant result in the t-test. The extreme outlier 19 value was replaced with the closest smaller value 14 to normalize the dataset.

General Instructional Behavior Across Subjects

Except of the laboratory using behavioral variables in science, the classroom instructions for both subjects share the same activity categories. The analysis of the data on the shared instructional variables presents a state of general pedagogical behavior that is in practice in Grade 9. Instructional behaviors like the group project work, library research and field trip reporting, students speaking, teacher questioning, teacher lecturing, notebook work, and teacher demonstration, and the use of audio-video and ICT tool use were common instructional activities that made teachers and students act and interact in the classroom in general. Table 10 gives the combined results of the instructional behavior of science and social studies classrooms.

Table 10

Time Spent in Instructional Behavior in Integrated Values of Science and Social Studies (Time in Percentage except of SD)

Instructional Behavior Categories	N	Range	Min	Max	Mean	SD
Group Work/Project	27	13.36	.00	13.36	1.16	3.47
Student Demo and Presentation	27	27.10	.00	27.10	1.77	5.45
Library and Field Trip	27	.00	.00	.00	.00	.00
Student Speaking	27	17.08	1.93	19.01	6.66	3.87
Teacher Questioning	27	6.69	.61	7.30	2.95	1.75
Notebook Work	27	37.15	.00	37.15	9.19	9.59
Demo. and Audio-Visual	27	8.99	.00	8.99	.82	1.94
Teacher Lecturing	27	53.12	38.31	91.43	72.13	13.96
Silence and Havoc	27	13.48	.00	13.48	5.15	3.82

Note: The mean values represent the percentage of class time spent in the behavior Shown

Table 10 depicts that 72.13% of the time was occupied by lecturing in the observed classroom. Notebook work occupied 9.19% of the time. The third time occupying category was student-speaking possessing 6.66%. Then, the fourth was teacher questioning with 2.95%. Teacher demonstration and audio-video use (.82%), group work or projects (1.16%), and student demonstration and presentation (1.77%) were very rarely occurring instructional behaviors. Field-trip activity did not occur in the instructional behavior. Hence, the statistical findings show that teacher lecturing and teacher questioning variables occupied 75.18% of the class time across the subjects and class sessions. Unlike this, student speaking and presentation activities have occupied 8.43% only of the teacher's time used in instruction. This portion represents the classroom verbal interaction between the teacher and students. The proportion of the time occupation indicates that there is no balanced verbal interaction between them.

Behavior Dynamism in the Evolved Systemic Contexts

This section of data analysis and interpretation attempts to answer RQ2 which intends to compare the instructional behavior in the past (in the time NESP) and present classroom. Though the time gap between the two studies is long, approximately four decades, it is significant for pedagogical research to explore whether the change occurred in the instructional behavior during the system's life. So, this research sought, whether there was a change in the classroom instructional behavior in the time span. On the other hand, the question has not been answered yet by any classroom researchers measuring the behavior through systematic classroom observation. In this context, the study was conducted and has yielded updated classroom behavior indicators which will update knowledge of the scholar community

on classroom instructional behavior. So, this researcher argues the study's significance, relevance, and validity.

The classroom behavior is context-dependent (Yoder & Symons, 2010). While talking about teaching context, there is not only one or single dynamic to make an interaction with teaching behavior. Of course, there are students, contents, professional communities, schools, departments, district-level education offices, and state policies, and systems, and their influence on the teaching contexts which is in the background of the teaching behavior (McLaughlin & Talbert, 1993). These reflect interacting microworld systems for which a teacher requires pedagogical context knowledge (Barnett & Hodson, 2001) to manage the complexity and uncertainty of classroom instructional behavior. From the CDS perspective, the constant interaction among the instructional systems causes change and emergence. Hence, the two successive instructional systemic contexts of teaching and learning practice in the year 1974 (during the NESP) and year 2022 (the present education system) are reflected in the policy and the empirical literature which obviously informed about the potential dynamics to classroom behavior.

Professional context during the NESP. Progressivism was introduced through the report of NNEPC as a groundbreaking pedagogical philosophy of modern education in Nepal (NNEPC, 1956) to change teaching contents and contexts. The NESP (1971-1975) was the milestone initiative in Nepal's education history characterizing a planned, centralized, and standardized approach to education and classroom pedagogical practice. For the sake of effective implementation of the plan, for the first time, the Education Act of 1971 was promulgated and enforced. However, there was a lack of opportunities to develop a career in teacher service. Weak teacher management, dissatisfaction with the salary scale and incentives, lack of qualified

teacher trainers, shortage of teachers, and teacher recruitment by local bodies of education (Shrestha, 2008) were the professional context variables in the early half of the 1970s. Moreover, by the early 1980s, 35 percent of secondary school teachers remained untrained (Gurung, 2012). Similarly, school infrastructures were very weak, insufficient, and inadequate. At that time, teacher development was used interchangeably with teacher training, which took a largely mechanical and top-down approach to developing the pedagogical skills and techniques of the teachers. Likewise, the official, planned, or written curricula for secondary education of that time lacked methodological components to make the students know the content knowledge and attain the proposed curriculum objectives (CDC, 1981). In conclusion, the context of the instructional system by 1974 was characterized by a lack of sufficient teachers, a lack of trained teachers, weak and insufficient infrastructure, top-down training, and no instructional activity specification in the curriculum. It means there was no pedagogically oriented systemic context for classroom instruction.

Present professional context. The present professional context has entirely changed in comparison to the year of the NESP. Various regional and international agencies worked and are working for a landmark change in the education system after the NESP. In science, the Asian Development Bank (ADB) constructed science laboratory rooms, provided science equipment/kits, and instructional materials, and conducted teacher training programs for quality improvement of secondary school science education (Asian Development Bank, 1998). Similarly, to enhance the effectiveness of classroom instruction, different types of training agencies like education training centers, resource centers, and lead resource centers, universities and their affiliated colleges, and non-governmental organizations have worked to

provide training programs to the in-service, pre-service teachers and institutional school teachers (Pillay et al., 2017). All school teachers are trained and certified for teaching with a teaching license. Moreover, the teacher training context has changed into teacher professional development emphasizing continuous, self-directed, reflective, and need-based training (NCED, 2010) and flexible modules and action research (Pillay et al., 2017) which is expected to empower the teachers' professional agency. Similarly, official or written curricula have explicitly and precisely recommended the content pedagogical skills to be enacted in the classroom.

In this sense, the dynamism concept has been used in this research to signify teacher and student interaction, activities, and changes across the life of the classroom system. The process of instructional acts and their changes within dynamic systems are regarded as consequences. Therefore, classroom behavior is a result of the inherent forces or a dependent endeavor caused by the complex systems in education. There are interactive influences of the systemic variables and contexts of proximal or distal levels (Bronfenbrenner, 1994) which are formal.

The instructional acts and behaviors that are enacted in the classroom are overt or explicit. So, these behaviors can be observed and measured with a certain system of measurement that is accepted by the scientific community and practiced by classroom researchers. The quantitatively measured behavior categories have the potential to compare and infer the results. In this research, the present classroom behavior and the classroom behavior in 1974, are compared to see whether there is a difference or not using a one-sample test. The values with normal population are being run into a t-test and most of the cases with non-normality are left for comparison at the descriptive level and one case, related to student speaking in science classrooms, has been adjusted to normalize.

Measuring Behavior Dynamism of the two Systemic Contexts

In science, the instructional behavior data collected from science classrooms have been statistically operated into two forms. The values of the classroom instructional activities violating the normal distribution in the Shapiro-Wilk test were analyzed using descriptive statistics and those that were found normally distributed were observed running a one-sample t-test. The classroom dynamisms occurred across the course of the chronosystem revealing changes in lives, generations, and historical events in the teacher's instructional behavior (Bronfenbrenner & Morris, 2006) between 1974 and 2022 in science are presented in Table 11.

Table 11

Statistical Indications of Classroom Dynamism in Science

Instructional Behavior Categories	In the Year1974 (Pfau, 1977)		In the Year2022 (At present)		Sig.	Change Direction
	M	SD	M	SD		
Laboratory Work (open)	.0	.0	.0	.00	n/a	Not in practice
Laboratory Work (structured)	.7	2.5	.07	.27	n/a	Slightly decreased
Group Projects	.0	.0	1.03	3.71	n/a	Increased
Student Demo., presentation	.0	.0	2.73	7.63	n/a	Increased
Library/Field-Trip Report	.0	.0	.00	.00	n/a	Not in practice
Student Speaking	6.4	5.1	6.82	3.19	.64	.42 (No sig.)
Teacher Questioning	7.4	6.8	3.20	2.11	p<.001	-4.19 (Decreased)
Notebook Work	4.4	6.1	11.02	8.37	.02	6.62(Increased)
Demo., Audio-Visual, ICT	5.5	11.9	.91	1.3	n/a	Decreased
Lecture	68.3	20.7	68.60	14.76	.94	.29 (No sig.)
Silence or Havoc	7.3	6.5	5.08	3.87	-	-

Note: The mean given in the table is in the percentage of time of the behavior that occurred in the classroom. The abbreviation n/a stands for significant test 'not applicable'. The boldface indicates the variables with normally distributed datasets and is valid for the one-sample test.

In Table 11, the t-test for observing a statistical significance does not apply to the cases of individual practical activities, group/project work, library research, field-trip reporting, notebook work, audio-visual, and demonstration classroom instructional activities because of the non-normal distribution of the behavioral values of the sample.

For them, the means of the two population samples have been compared directly at the descriptive level.

In the behavioral cases of student speaking, teacher questioning, notebook work, and lecturing, a one-sample t-test was run to observe a significant difference between the two mean values of representative samples through a one-sample t-test at a 95% confidence level. In the variables like teacher questioning and notebook work, the null hypotheses were rejected with $p=.00$ and $.02<.05$ respectively, and alternative hypotheses were accepted. That is, the change in teacher questioning and notebook work are statistically significant. However, the mean difference in teacher questioning is -4.19% which indicates this instructional behavior in the classroom in science decreased. In notebook work, behavior in the classroom was found to be increased by 6.62% . It shows that notebook work has comparatively increased in science.

Table 12

Statistical Indications of Classroom Dynamism in Social Studies

Instructional Behavior Categories	In the Year 1974 (Pfau, 1977)		In the Year 2022 (At Present)		Sig.	Change Direction
	M	SD	M	SD		
	Individual Practical Activities	.0	.0	.23		
Group Work and Project	.0	.0	1.30	3.37	n/a	Increased
Student Demo and presentation	.0	.0	.90	1.95	n/a	Slightly increased
Library/Field Trips Report	.0	.0	.00	.00	n/a	No change
Student Speaking	6.6	4.5	6.01	3.25	n/a	Slightly decreased
Teacher Questioning	7.0	5.2	2.72	1.36	.00	-4.28 (Decreased)
Notebook Work	.8	3.5	7.49	10.6	n/a	Increased
Demo., Audio-Visual/ICT	.8	1.5	.73	2.40	n/a	No change
Lecturing	81.3	10.5	75.4	12.8	.11	-5.88 (No sig.)
Silence or Havoc	3.5	2.4	5.21	3.92	-	-

Note: The mean given in the table is in the percentage of the amount of time the behavior occurred in the classroom. The abbreviation n/a stands for significant test 'not applicable'. The boldface indicates the variables with normally distributed datasets and is valid for the one-sample test.

The dynamism of instructional behavior occurred in the social studies classroom across the chronosystem, as stated by Bronfenbrenner and Morris (2006), over the life and across teachers' generations, and through historical time of the system between 1974 and 2022 are given in Table 12.

Table 12 shows the statistics dealing with instructional variables in social studies. The variables, namely, individual practical activities, group work or project, student demonstration and presentation, library research and field trip, student speaking, notebook work, teacher demonstration, audio-visual, and ICT use- have been dealt with descriptive values to interpret the difference. Since they failed the normality test. The t-test was not applied to them. However, a direct comparison of the means of the two instructional systemic phases on the respective variables was performed.

The study shows no practice of individual practical activities, group work and projects, and student demonstration and presentation categories in the classroom during the NESP. But in the present classroom in social studies, it was found that .23%, 1.30%, and .90% of the time was occupied by the categories respectively. Hence, it shows a bit increased in the practice of these categories. Similarly, notebook work has increased tremendously in comparison to the past. However, teacher demonstration and use of audio-visual activities have not changed in instructional practice. ICT tool, such as the smart-board have been used in school classrooms but it has no significant effect on the mean value of teacher demonstration and audio-visual use.

For the other two variables, a one-sample t-test was run to observe statistical significance. On the teacher questioning test, the result showed $p=.00<.05$, rejected the null hypothesis but to the negative direction by -4.28% mean difference. This

nonlinear change of behavior signifies a complex role in the dynamics of the instructional system. Though the macrosystem's intent seems to make a substantial change by reducing lecturing time, the test on lecturing behavior yielded no significant change between the two samples of the population.

In conclusion, the quantitative research results on classroom instructional variables in grade 9, science and social studies, have indicated the present and past classroom behavior scenarios in the form of statistical indications. Library study and field trip activities in both science and social studies and unstructured laboratory work in science were not in practice in the past classroom instruction, nor they are in practice in the current classroom instruction. However, a little glimpse of change in group work or project work and student demonstration and presentation behaviors is found in the present classroom instruction which was not in practice the year back. Student speaking, teacher questioning, notebook work, teacher demonstration, audio-visual use, and lecturing are found enacted in the past and present in both subject school classrooms.

Among the observations, the values on teacher questioning and lecturing behavior in both subjects and notebook work and student speaking behaviors in the latter classroom in science subject were found normal, and they were run into a one-sample t-test. The test results showed that there is a significant difference in teacher questioning behavior in both subjects and in notebook work in science subject. The difference indicates that the questioning behavior in the present classroom has decreased significantly compared to the past in both subjects but the notebook work behavior has significantly increased in science instruction. The test has also shown that the teacher lecturing behavior in both subjects and the student speaking in science subject are not a statistically significant change, despite the intents of the macro

system policy provisions and pedagogical discourse. These types of changes are unintended which signify a non-linear and unpredictable dynamism in classroom behavior.

The statistical results indicate approximately the same pedagogical behavior in secondary classrooms during the NESP time and in the latter today though the macro system instructional policies like university courses for four-year BEd (FOE, 2015), national education policy (MOEST,2019), National Curriculum Framework (CDC, 2007; Curriculum Development Center, 2019), teacher development policy guideline (NCED, 2010), and exo-system policies like curriculum for secondary education (CDC, 2020), teachers' guide science grade 9 (CDC, 2019), and teachers' guide social studies grade 9 (CDC, 2019) have coherently emphasized on interactive, constructive, and activity-based teaching and learning activities. However, it is not reflected in classroom instructional behavior. The classrooms of secondary school have not significantly changed in terms of time occupation of teaching and learning behavior. This tells that there is no absolute linear change in the classroom behavior of the teacher and student along with the linear instructional system. Despite the changed professional, legislative, and infrastructural contexts, the state of the instructional behavior categories that prevailed in the classroom can be categorically summed up in the points below.

Activity-based instructional behaviors like laboratory experiments and library research and field trips were not in practice in the past and in the present as well. The students' individual practical activities like drawing maps using scales in geography, group work, project work, and oral presentations on assigned tasks have come into practice, though they are too rare. The classrooms were strange places for these activities in the past. Student speaking means questioning, arguing, sharing, and

interacting, through which the students can acquire content knowledge widely and develop language competency, communication skills, and critical expression. Despite this, the student speaking time amount is extremely lower than the teacher lecturing or speaking which shows there is very little interaction in the classroom. The amount of student speaking behavior has not increased while comparing the present classroom with the past.

Teacher demonstration and audio-visual and ICT instrument-using instructional behavior in the classroom were rare in the past and it is still the same in the present. In the case of science classrooms, the amount of time spent using audio-visual instruments and demonstrations has decreased. This situation hints at instructional behavior that is not technology-integrated or blended.

Teacher lecturing behavior represents collective activities of the teacher's instruction, writing on the board, dictating, and textbook reading or paraphrasing for students. Approximately 68% of classroom teaching time is occupied by teachers' lectures alone in science classes, whether that is in the present classroom or the past. Similarly, although the research result on teacher lecturing in social studies classes seems to show a decrease from 81.3% to 75.42% while comparing past and present respectively, that difference was not statistically significant. And so, the difference may have occurred merely by chance alone, and, as in science classes, there may not be a real change in total social studies teacher lecturing behavior from 1974 to 2022 even though the 75.42% number is lower.

Among the instructional activities, the notebook work behavior, which consists of completing the assignments given by the teacher, solving exercise problems from the textbook, and correcting students' homework in classroom time, has dramatically scaled up. During the NESP, it was .8% in social studies and 4.4% in

science; in present classrooms, it is 7.49% in social studies and 11.02% in science. However, the formal and official instructional policies concern the level of meso-, exo-, and macrosystems.

The class time spent on the student's behavior handling, phone call receiving, classroom leaving, school notice reading, and irrelevant talks and behaviors are collectively represented by the "silence or havoc" behavior category. It occupies approximately 5% of the time in present classrooms, which has decreased in science but increased in social studies. In brief, classroom dynamism is characterized by the instructional behaviors categorically null/non-existent, constant, reversed, transformed, and non-oriented behavioral activities.

Chapter Five

Teacher Perceived Dynamics of Instructional Behavior in Complex Systems

This chapter concerns the collection, organization, and analysis of qualitative data to answer the research questions RQ3 and RQ4, with empirical evidence collected from the teachers who were deeply attached to classroom activities. These research questions intend to explore and explain the dynamics/interacting factors of classroom instructional behaviors and the role of the dynamics in strengthening, transforming, sustaining, or hindering the behavior as perceived by the teacher. The narrative interviews were conducted to elicit lived, in-depth, comprehensive, and covert information from the research participants. Accordingly, the teacher coded as C28027SciPMB was found occupying the highest time in student speaking behavior with 19.01%, the teacher C28207SSStKD with the lowest time in teacher lecturing behavior with 50.20%, the teacher C28027SSStMPN with the highest teacher lecturing behavior with 91.43%, and the teacher I28202SSStBCG with a high preference for notebook work with 37.15% of the time. Hereafter, the research participants are read as SciPMB, SSStKD, SSStMPN, and SSStBCG. This chapter has established the evidences (Clare, 2004) collected through qualitative methods.

Behavior is an effect variable of dynamics. The work of a behavioral researcher is to develop descriptions, predictions, and explanations of behavior (Cozby & Bates, 2018; Leary, 2014). Moreover, Cozby and Bates (2018) opine that research is to explore the causes of behavior. In this sense, instructional behavior occurring in the classroom depends on cause(s) or dynamics. All these are perceived as interwoven in operation. Cozby and Bates (2018) further argued that:

The determining cause and developing explanation of behavior are more closely related to each other which emphasizes seeking to understand why the

behavior occurs. But it is difficult ever to know the true cause or all the causes of any behavior. On the other hand, an explanation that appears satisfactory once may turn out to be inadequate when other causes are identified in the subsequent research. (p. 39)

This informs this researcher that classroom behavior is not static, but rather evolving due to the interactive causal dynamics influencing the behavior. The dynamics behind the instructional behavior categories are also changing and emerging which make behavior emerging, dynamic, and adaptive. Hence, empirical research in the natural setting informs (us) about the behavioral change occurring in the complex systemic context. Leary (2014), further, claims that most researchers regard explanation as the most important goal of scientific research. This researcher's scientific explanation is based on empirical testing in the field by collecting practitioners' perceptions as evidence.

Context Set for Digging out Perceived Experiences

Qualitative information was generated in the natural context of the interview setting through the process led by the interviewee. In this research, interview time and place for data collection were scheduled as per the convenience of the interviewees. The schedule was prepared through telephone conversations with them. According to the schedule, the data collection plan was developed and instruments were set. It was conducted during their leisure time, on holiday, and before school hours of the teachers/interviewees. Some interviews were conducted in the school head teacher's room for those research participants who had dual roles i.e. classroom teaching and school leadership or position of headteacher. For other research participants, the interview took place in public places, i.e., a monumental place near the school or a tea shop considering the interviewees' convenience and comfortability as they had

suggested. The audio-recorded interview sessions occurred for 50 minutes to 1 hour and 50 minutes. The audio recordings (see [Appendix S](#)) took place with the permission of the interviewees. Hence, the process of research followed was ethical, attached, collaborative, and in a natural setting.

Data Preparation and Analysis Framework

Data were prepared for analysis right after the completion of data collection. Data preparation consists of data extraction from audio format, cleaning, transcribing, and entry for analysis with software. The researcher employed qualitative software to organize the narrative text (transcription) data generated from four participants. For the purpose of processing, Computer-Aided Qualitative Data Analysis Software (CAQDAS) like NVivo was employed as a data organizer tool. The processing was categorically placed into interview transcription, NVivo functions (input, process, and output), and write-up. The data processing activities performed by the researcher were categorized into five processes. Firstly, the collected audio interviews were manually transcribed by the researcher himself in Word sheets and stored as Word files individually. Secondly, the files were imported into NVivo software. Thirdly, the texts of the transcripts (see [Appendix T](#)) had been coded aligning with the research questions RQ3 and RQ4. The codes having the same sense were merged into categories and given categorical names to them. The categorical names were constituted as sub-themes of a theme. This coding and thematizing were performed, as suggested by Rivas (2018) and Xu and Zammit (2020), with an integrated strategy of deductive and inductive approaches. It means the first theme was established from the theoretical and conceptual framework and research questions and then the texts were coded accordingly. Likewise, the transcripts were carefully and thoroughly read for any unique evidence and the texts were coded, the codes were categorized and thematized. Hence, the data processing was queried for suitable results based on the

from the interview transcripts are closely interfaced with the concepts/dynamics assumed in the conceptual framework of this study. Similarly, the words in the cloud hit the activity categories discussed in the interview process. The words in the word cloud, Figure 4, highlight the contents of the interview and possible dynamics involved in behavior dynamism. This also ensured the validity of the qualitative data collection. Similarly, the keywords in the interview helped to identify the focus of the qualitative data analysis.

In the following thematic analysis, the sub-themes under the first theme provide the basis for data triangulation to the result of quantitative data analysis, given in [Chapter Four](#) about the changing classroom situation and its impact on successive teacher generations. It gives the narrative evidence about whether classroom behavior has linearly changed over time in the context of complex instructional systems dynamics. Then, the subsequent themes explain the complex causes or dynamics of the classroom instructional behavior and their roles in the instructional behavior enactment.

Inherent Evolving Dynamics

Teachers' instructional behavior intersects with the longitudinally capitalized systemic and professional assets. In the ecology of the system, as argued by Bronfenbrenner and Morris (2006), the behavioral phenomenon of the classroom extends over the life course and across successive generations of teachers, as well as through the historical time of the education system. In this sense, the instructional system as a subsystem of the educational system has a historical continuum of inherent change and continuity of the instructional behavior getting a constant interaction with the complex dynamics in the system. This system fosters an evolving and dynamic landscape of the teacher generations coming down with learning and, as well as, critically reflecting

instructional behavior of their school teachers and senior teacher generations. On the other hand, a teacher's instructional behavior intersects with the longitudinal professional career phases. At the center of professional development, the role of reflection is crucial which evolves through practice. Hence, the research participants' perceptions of inherent evolving dynamics are dealt with in two subthemes.

Instructional Behavior over the successive teacher generations.

School system classrooms are intergenerational behavioral learning zones. The teachers' instructional behaviors are open to their students and colleagues to observe, receive, react, and reflect. Teachers from different generations have divergent experiences beliefs, values, and attitudes associated with them (Portela Pruaño et al., 2022) are expected to influence their instructional behavior. In the interview, the teachers were asked to compare their instructional activities and the activities they perceived in the classroom of their school teachers when they were students. This presents the instructional behavior practiced in the classroom of the two consecutive teacher generations, perceived by the research participants. They were secondary school students in their early life and are teachers of secondary education in the present. Across this decades-long period of classroom practice undergone through the complex dynamic life of the system has intersected the changing theories for pedagogical transformation, teacher education, official instructional policy, and local school system context. The research participants' perceived experience reveals information about the nature of classroom instructional behavior. SciPMB, a teacher who spent 29 years in a teaching career, had got secondary education 48

years back from the oldest school established by the Ranas, recalled his lived experience:

There was no separate science laboratory. But science apparatuses seemed to be kept in a room. The teacher who used to teach science was also not from a science background. We presumed she was from a science background in the beginning. But, later, we knew that she was from home science subject. She would teach by lecturing. She would let us write from her notebook. Then, she would ask us from the notes given. So, we used to learn by heart the noted-down things.

He further reflected on his present classroom practice comparing it with his teacher's classroom practice that happened nearly forty years back:

I don't see any substantial changes. I also follow the same method. Not the case only at this school, I was in some more schools as a science teacher before this school. I perceived that there was also the same practice prevailing, that is lecturing. But at present, technology is replacing the lecturing behavior. The technologically wakeful teachers' role is there. So, there is a little bit of change in classroom teaching.

Another teacher, SStMPN, teaching social studies for 24 years shared his lived experience on the classroom practice of his own and his school teacher. He said recalling the classroom teaching activity of 28 years back when he was a student in grade 9. He shared:

There were no methods except lecturing and memorizing, neither there was note giving, sir. It was the classroom practice in 1985/1986 while we were in secondary school as students. The gurus used to tell us to read and read, learn by heart, and do this and that. They used to give us physical punishment if we

did not do homework. The students had to be active to complete the homework due to the fear of physical punishment. Now, there is such a situation that some students do their homework, whereas others may not. In such conditions, they are scolded for not doing their homework, but we do not punish them physically. We have been instructed to treat them friendly. Nowadays, as I have felt, the students do not take our instruction sincerely due to the teacher-student proximity which has deteriorated learning more than in our time.

He further added that:

Talking about the teaching method of that time, the teachers used nothing except lecturing. However, today, a bit of change is seen among the teachers. They have realized that they need to use other methods as well to activate the students.

The third research participant also echoed a similar perception of the classroom activities in the past as a student and in the present as a teacher. This teacher who had 11 years of experience in public school classroom teaching was a student in secondary-level education 23 years back. He shared his lived experience:

When I was a school student, the social studies teacher would come into the classroom and read the text spontaneously then he would say "read children". This was the classroom situation by 2000. He would ask us to do an exercise in the lesson.

He said he had never experienced other teaching activities in the classroom. In contrast to this situation, he stated:

Nowadays, in my class, PPT presentations/demonstrations are very much common. In my geography class, the students take a virtual trip live on Google

Maps to show the Dead Sea and London Bridge which also come under the demonstration. Apart from this, discussion and question-and-answer activities are in practice in my classroom teaching. Sometimes, I tell them to prepare questions from their textbook. However, I do not inform them about the purpose of their questions being made.

In conclusion, the teachers reflected on and compared the past and present classroom practices, nearly forty years' course of the system. The past classroom practices represent the classroom instructional contexts with poorly trained human resources, infrastructurally less equipped learning spaces, and limited teacher development policy precisions in comparison to the latter. The analysis of teachers' perceptions, as a student in the past and as a teacher at present, shows that there is no substantial change in classroom instructional practices. In the past, teachers dominated classroom behavior through the use of teacher lecturing, note-giving, making to learn by heart, and asking to retrieve the memorized things. The student activity-based instructional behaviors in the classroom were very rare, and activities like laboratory work, and fieldwork were absent. It is assumed that there would be a transformation of the classroom practice from teacher-active to student-active instruction as per the intents of the teacher education, discourse, and instructional policy and the changed school context linearly. However, lecturing behavior prevails as a perennial and dominant instructional behavior across the teacher generations. Furthermore, the teacher revealed information showing the emergence of a new instructional dynamic resulting from ICT development. It seems that teacher activities like lecturing and demonstration are being replaced by adapting the instructional behavior to the available ICT tools. In sum, the research participants' experiences tell

professional context have changed and the activities in the classroom have widened to some extent across the system's lifespan.

Instructional behavior along with distinct career phases. The teacher's classroom-based professional journey goes through a formally assigned role and responsibility within a complex system formed from formal and informal dynamics. The context perceived by the teacher reveals a reality in which the experiential knowledge of the teacher is formed. The knowledge is expected to play a role in shaping instructional behavior. The classroom context evolves through the interaction of student characteristics, teacher characteristics, infrastructure, curricular materials, and the school system which is reflected in the expressions of the teachers. SciPMB, a teacher with 29 years of classroom experience, shared his mixed perception of his professional capital and its decline:

When I meet my previous students, some of them proudly share the experience that they had perceived from my career beginning classrooms. As you know, I have taught for a long time, and currently, I am working as a headteacher as well. So, these days, I feel a kind of tiredness in teaching.

This teacher had dual responsibilities as a teacher and at the same time head teacher of the school. Sharing how he had been managing the two roles, he added:

That spirit has faded. Likewise, responsibility has also changed now. As a Headteacher, I should be busy with administrative work. These may have also caused me to feel tired. Despite this, so far, I think I have been delivering the required subject matter to the students in the classroom. These are about professional matters.

Hence, teachers have been acquiring different experiences from the inception of classroom professional life to a professionally grown-up life. It is ever-evolving in nature. The expressed lived experiences of the teachers are dealt with categorically in two segments, such as, novice or beginner teacher and professional teacher.

Teaching behavior being a beginner. The teaching career of a teacher starts as a beginner becoming a professional teacher. The beginner teacher comes across complex instructional dynamics. Generally, everyone is more or less informed about the dynamics before entering the classroom setting. There are also explicit provisions and procedures of the teacher selection to permit only those persons who are qualified. However, practice in behavior is not an easy task. In the beginning, it is a challenging task for a beginner teacher to manage the instructional behavior at the intersection of the instructional dynamics in practice. SStMPN shared "at the beginning when I started to teach, I used lecturing". He further added:

As a beginner in teaching, I was unaware of the students' characteristics. So, I used to work hard on teaching content to face the questions that would be probably asked by the students. I would prepare notes for the students.

According to him, at that time, this profession was considered a noble job. Another teacher SstKD who had started a teaching career in a private school and later entered a community school said that "When first I taught in a boarding school, my teaching was without knowledge of methodology". He further shared that "I used to read the textbook line by line and let students write the meaning of words by adopting the process that our teachers used when we were school students". He also recalled how his teaching behavior had a bit transformed as he was shifting from one school context to another and certainty of his professional career and stated that "then, in the subsequent years, I taught without the textbook. But I used to take it to the class. I

used no teaching materials while I taught in that school". He shared the attitude of the students towards the teachers' classroom practices in that time:

I came to know that the teacher who teaches by going through the textbook is not trusted by the students. The teacher who reads and makes the student read the textbook line by line means that the teacher doesn't know the content.

The third teacher also started his classroom teaching career entry from a private boarding school and then shifted to the community school system. Like other beginners, the third teacher also had significant experience in early classroom practices. As he stated "in the very beginning, when I had no teaching experience at all, I feared that I might not be able to perform or deliver content knowledge. So, I had to do intense preparation before entering the classroom for teaching."

Hence, his first classroom teaching in a community school was not the first classroom experience. However, he had experienced a distinct classroom context about using the textbook. He communicated with this researcher that:

At that time, the notion that "teaching should not be carried out by reading text lines from the textbook" deeply impressed me. We used to enter the classroom with good preparation on content. Particularly, I used to enter the classroom with already prepared points that would be written on the board and to be given as notes to the students. But I would not take any additional materials.

In conclusion, beginner teachers had challenging experiences in their first classroom practice. They perceived content knowledge to be more important than pedagogical techniques and skills for effective content delivery. The content delivery by lecturing followed by a limited question-answer and blackboard use was the main instructional practice. The expertise in the textbook content knowledge was an

expectation of the then students which is considered as the perceived dynamics that shaped the teaching behavior of the teachers.

Teaching behavior being a professional. The term, ‘professional’, used in this study is to characterize the advanced phase of the teacher career attributed to professional capital and professional agency that evolves through a series of classroom teaching experiences over many years. Thus, professionals are regarded as assets of the school system and the state system. Professional capital is one’s own as well as a group’s worth gained through a long course of practice which consists of human, social/community, and decisional capital. The power of professional capital sheds light on one’s professionalism as smart and talented, committed and collegial, thoughtful and wise (Hargreaves & Fullan, 2015), and worthwhile behavior.

Positioning the human capital at the center, the professional life of a teacher is a process of enactment of a professional agency which matters the professional practice, reflection, and transformation of adapting teaching behavior in the complex setting. In this context, professionally established teachers are supposed to possess instructional experiences perceived as idiosyncratically meaningful. In this regard, teacher SStMPN shared his experience that "relying on how they (students) can learn, we use lectures and then question-answer methods and classroom assignment." According to him "the student's learning behavior declined due to the change in the evaluation system from percentage to letter grading system adopted by the Government of Nepal". Likewise, he shared his perception on changing teaching efforts to respond to the students' declined learning behavior:

After replacing the percentage grading system with the letter grading system, the students are not enthusiastic about studying. Our long experience in teaching shows a slight decline in the number of students. But we are using

effort to make students active through question-answer and discussion. By these strategies, the students are likely to learn in the classroom.

Another teacher, SStBCG, teaching social studies, claimed that his classroom teaching is worthy and professionally sustainable with reference to the values his students ascribed to his teaching. In this line, he shared his classroom perception "The main thing is that the students liked my way of teaching. No students are complaining about my teaching till this time. Therefore, I have been keeping in the teaching job". He shared his classroom teaching behavior which established him as a sustained teacher. He stated that "I usually write on the board, tell them, clarify the things, ask them questions, discuss, and lecture. These have been used simultaneously". He further added that "I do not dictate notes to the students. I give them homework. I tell them to note down. But I do not trouble them by asking them to have a separate notebook". He perceived the classroom instructional behavior in the institutional school classroom as distinct from that of the community school, as the institutional school is marks-oriented as demanded by parents. In his view, the instructional behavior adopted by the institutional school teacher was that "asking questions to them (students), letting them write, and making them learn by heart. The focus of such strategies is on how the students get high marks".

SStKD was the third respondent who resisted the mode of teaching by paraphrasing texts from the textbook. In his experience:

If a teacher starts to deliver content information on a topic without looking at the textbook, then only the students are impressed by the teacher. Especially, this kind of situation is found in the students of secondary level or upper classes of the school. If a teacher can do so, then the students think that the

teacher knows. This teacher is trusted by the students in the present classroom context.

Regarding this, he shared the following incident that happened in his classroom teaching:

Once I was teaching about the Ozon Layer and Greenhouse Effect, and the class was attentive and silent. Then suddenly, I heard two boys talking about my teaching, "We heard that this sir knows nothing. But he seems to know everything". Then I told them "Boys! You are right. I know science, social studies, and English. But the only subject I don't know is mathematics".

Teacher, SciPMB, who had crossed nearly forty years of his career path perceived his present professional life as tiring. He recalled his spirit in the early career stages and compared it with the present declining spirit and said that "it has been a long span of professional life. So, I feel a sort of tiredness now. That spirit has faded". This may show that teachers do not tend to be enthusiastic about transforming classroom practices anymore in their later years of professional careers.

The instructional behavior in the teacher's professional life is based on the value perceived in the classroom practice. The students of secondary school education are expected to master content knowledge rather than pedagogical suitability for their learning. So, the teacher's reflective professional agency is found active in and around delivering the content information given in the textbook through lecturing, demonstrating, discussing, and performing question-answer activities.

In conclusion, the discrepancy in the teachers' instructional behavior between their beginning and matured professional phases is significant qualitatively. In the beginning, the teachers are engaged more in the grade and subject-specific content knowledge preparation to respond to the student's expectations regardless of the

pedagogical aspects of making learning more effective. The beginner teachers find space for their professional initiation at the point where their content knowledge, delivering behavior, and student expectations intersect. For content delivery, the teacher is found picking up the lecturing mode. In the subsequent classroom instructional and academic sessions, the power of the teacher's content knowledge dominates the classroom environment. Similar pedagogical behavior, that is, lecturing or any other teacher-centered activity for content delivery is gaining authenticity and capitalizing on the teacher-dominated culture uncritically in the school system. The teacher communicates content information mostly through lecturing which is followed by demonstration, question-answer, and discussion activities, but they are rare. The teacher's professional agency, which is expected to activate decisional capital, does not appear to be functioning as the policy intent, and the university's pedagogical discourse toward transformation. It reveals that teachers' transition from novice or beginner to expert is a non-linear process (Nolan & Molla, 2017) since the career development course evolves along with the teacher's professional life.

Instructional System Dynamics Intersecting with Classroom Behavior

Instructional behavior is caused by the effect of a complex interaction of the dynamics of the instructional systems. The influence of the dynamics is perceived by the teachers who are involved in the classroom. The dynamics experienced by the teachers are presented.

Training interventions for behavior transformation. Teaching is a skill-based profession. Training is devised to modify the teachers' behavior as per instructional policy intents. The teachers participate in skill development programs before and during their teaching career. Such programs are expected to intervene the spontaneous behavior and shape the teacher's instructional behavior and; are expected

to enact the instructional skills acquired through teacher education and training processes. The research participants were asked about their participation in training and its impact on classroom instructional behaviors. SstMPN who had participated in ten-month in-service training and TPD training, shared his experience:

I had no idea about student active learning before participating in the teacher training. After participating in the training, I knew that students should be activated, and the teacher should play the role of facilitator. Before that, I would teach focusing more on giving notes and making students learn by heart. However, such teaching would not lead to sustainable learning.

He further talked about the adaptability of the skills learned from the training:

In the training session, we also had to demonstrate our teaching skills. However, we are not applying the learned methods and skills exactly as they were taught. In the training, we were taught about many things, like seating arrangements. However, these are not found to be entirely appropriate here. So, we are using a way that suits the students' activation.

Another research participant, SStBCG, recounted the training context, the skills learned, and the behavior changes from teacher training, and reacted:

They gave us theoretical knowledge. I found there were only a few practical issues raised. For instance, they used to deliver a lecture stating this scholar had said this, another had said that and so and so. However, there was no discussion about the potential challenges in practice, possible students' reactions, and ways to solve the problems raised in the classroom.

This shows that training approaches were theoretical and decontextualized which were less likely to be matched with the needs of the teachers for instructional

skill development. However, he claimed a training that benefitted his classroom teaching:

The municipality taught us to make a map of Nepal. That was a new way of making a map of Nepal for me. Before the training, I used to draw the map differently than the way taught at the training. After the training, I have been following the way to draw Nepal's map.

Research participant SciPMB said that he had learned the Jigsaw method from training and adapted it to his classroom teaching context. He also taught about this method to his colleague teachers as well. Similarly, the fourth teacher's experience in Teacher's Professional Development (TPD) training was that the training focused on curriculum implementation and content-related problems rather than instructional methodological problems. He stated that "the TPD training that I participated in focused on curriculum implementation rather than classroom teaching methods. The trainer asked us about difficulties in subject and contents faced in the everyday classroom teaching rather than about teaching methods". It shows that the demand-driven TPD training did not respond to the methodological problem of classroom practice. The teachers also raised content-related issues in the training rather than the instructional techniques to deliver the content. SciPMB recalled the most impressive learning at a training event organized by an institution named Ekka and shared his experience that "the institution had organized an environment-related training for the children. I learned the most important thing that 'we must go to the level of children'." He claimed he has been using this approach in classroom practice since that time.

In conclusion, the teachers in the study did not get adequate training opportunities related to the classroom instructional process. From the experience

sharing, it is found that the teachers acquired some pedagogical skills, pedagogical procedural knowledge, and a knowledge of pedagogical role positioning from the limited training opportunities which were not adequate and sufficient for them. Among the learned skills, that intersected with curricular intent, teachers' needs, and classroom practicability are found to be enacted through and sustained as teachers' instructional behavior. Hence, the training programs have shaped the teachers' teaching behaviors to some extent. However, in the teachers' perception, the training processes are mostly theoretical, content-focused, and decontextualized, so the role of the teacher's agency is crucial in translating them into behavior and transforming the classroom teaching tradition.

Purpose and preference of instructional activity selection. The classroom is a formal instructional setting. It requires a teacher to carry out activities purposefully enacting the pedagogical intent prescribed by the official curriculum through the teacher's adaptive instructional behavior. In this context, the classroom teachers had unique experiences in selecting and enacting instructional activities. The results of the classroom observation research show that more than half of the class time of a teacher was occupied by the lecturing activity to explain the lesson content. For Bligh (2000), the purpose of lecturing is to deliver content information, promote thought systems, and change attitudes and behavioral skills. Teacher SStMPN, whose classroom teaching behavior was extremely dominated by lecturing activity occupying 91% of his instructional session, stated "they (students) are easily activated by using question-answer. We can use questioning to stop the students' gossiping activity in the class, which frequently happens in lecturing".

Another research participant SStBCG, who emphasized notebook work that occupied 37% of the instructional session, shared his experience on activity selection

that “question-answer method helps to increase the students' learning. They ask questions and write the answers in their notebook. The students have to be asked questions in class which makes them able to write answers in the exam”. He further claimed that "It requires them to write because they have to write for the exam. Therefore, all are engaged in writing”. He mentioned the classroom activities he was using that "asking them questions having them write, and making them learn by heart are activities I use. The focus is on how the students get high marks”. Hence, the first respondent used the question-answer strategy as a device to control the unnecessary behavior of the students, whereas the second respondent used it to make the students memorize the content information.

The third interviewee, SciPMB, shared his classroom experience on instructional activities that he used to assign project works and report preparation apart from the lecturing. He believed that the students enjoy the activities in the natural context and they can have perfect knowledge through the work. The fourth interviewee shared an experience that was different from the three interviewees. According to him "categorically, the lecture method comes first place because our students are weak.” He further shared his perception on this method:

The students have a mentality that the 'teacher has to deliver the content'. At the same time, teachers (we) have also a mentality that students have no curiosity. So, if we deliver content to them, they can learn from it. They do not raise questions and they are rarely curious. In this situation, we think that if we deliver the content, they will grasp or learn more. Sometimes, I ask questions, but I find them not participating in learning actively. The students do not understand the content taught and they don't answer the questions asked after teaching the lesson. They don't do the reading (study) assignment. This

situation has brought the teachers back to the use of the lecture method to deliver content. So, we have to rely on lecturing. On the other hand, we have no infrastructure and resources to use the demonstration method.

In a conclusion based on the teachers' lived experiences, lecturing, and question-answering are common instructional behaviors enacted by the teachers. They use lecturing activities to stimulate the students to conceive the content knowledge easily, develop thought, and change attitude and behavior skills. The question-answer activity is used to control students' havoc behaviors, facilitate memorizing content-related information, and activate them. The teachers' instructional activity decisions were found to be influenced implicitly by the essence of the learned pedagogy and informed policy. It is found that the teachers' instructional behaviors are shaped explicitly by the immediate and proximal context rather than the distal systemic context spelled in the policy documents. The teacher's decision on selecting activities of appropriate difficulty level, structuring the activities for students, and then monitoring and scaffolding their works (Brophy & Alleman, 1991) depends upon the insight developed through the perceived immediate context created by the classroom instructional dynamics. Hence, the immediate purpose of selecting an activity is more powerful influencing dynamics that let the teacher adapt and evolve instructional behavior.

Student characteristics. The teachers who participated in the narrative interview expressed their classroom lived experiences and encountered numerous attributes of the students. They felt, observed, and analyzed the characteristics that are to be dealt with through appropriate instructional means. The intersection of systemic order and student characteristics (chaos) challenges the teacher's intended instructional behavior to function as desired in the policies. The teacher's instructional

behavior finds space somewhere at the edges of order and chaos. In the interview, a teacher shared his perception that the letter grading system introduced by the Government of Nepal has lowered the learning enthusiasm of the students. In this view, the students cannot be taught effectively due to their lack of fear of the exam. Another research participant, SStBCG, shared the students' characteristics related to learning historical events "the students feel that the History subject is too difficult. They say they cannot recall the dates, don't know them, and it is useless". As he shared his ways were lecturing, questioning, and making the students memorize the historical events. This way of instruction in the private school has promoted the technical process of development of the students rather than the humanistic process of development. Another research participant, SStKD, shared his perception that:

When I teach the history portion of social studies subject, I keep on telling events one after another till the bell rings. While I am leaving the classroom, I question myself. 'What did I teach? Did they understand? Because all students are silent; just keep on looking at me constantly, with no sound, and no questions. What may be other ways to teach this portion?' This situation makes me sometimes unpleasant with such worthless teaching.

This evidence justifies that this teacher sought alternative teaching approaches to reduce and replace teacher-centered instruction, i.e., lecturing, even for history-like lessons. Learning from the experience, this teacher found himself practicing innovative instructional activities. Fifty percent of his classroom teaching time was used for instructional activities apart from lecturing. This represents among the lowest time-spending teachers for classroom lecturing in comparison to the other social studies teachers who participated in this research. He kept on telling to this researcher about his observations of the student's behavior, saying that "the students do not

attempt the given assignments for reading work. Rather they are happy to visit places and collect information”.

Hence, the teacher adapted his instructional behavior to respond to the student's interest in activities. The fourth interviewee, SciPMB, who was a science teacher from a school with a very weak infrastructure, shared his perceptions about his students' socio-economic background and passive participation in classroom teaching and learning activities. As he stated, "The students are from a backward community. So, I think, they cannot engage themselves in self-study. They are less active in classroom discussions and questioning”. He further added:

If there were active students in a class, classroom teaching would be a pleasure. As you know, classroom teaching with passive students is not enjoyable. Some classes are more enjoyable than others mainly because of students' active participation in learning.

In conclusion, as perceived by the classroom teachers while working with the students for student learning, they identified student characteristics rooted in personal, academic, and socio-economic dynamics that influenced teaching and learning activities. Through the constant interaction of the teachers with the students and their observation and reflection, they are familiar with the student's characteristics. This experiential knowledge capitalized in the complex context helps them to decide and enact the instructional behavior that possibly responds to the implicit pedagogical requirement of the students.

Curricular-informed dynamics. The curriculum is regarded as a course for teachers and students. It reflects complex systems that are conceived as macro systems at the national level and perceived as microsystems at the school/classroom level. Generally, classroom teaching and learning behaviors are interpreted in and

around the premises of the official curriculum system. Such curriculum systems encompass several components that are:

A list of subjects to be taught, quantities of instructional time allocated to subjects, authorized textbooks to accompany classroom instruction, authorized lesson plans or syllabi delineating the topics to be taught, and official directives or guidelines concerning pedagogy. (Benavot, 2008, p. 61)

The term 'activities' used in this study is directly related to the official or intended curricula which are prescriptive activities given in the teachers' manual or teacher's guide. It is analyzed as an enacted curriculum if the teacher follows the suggestions given in the teaching manual/teacher's guide.(Brophy & Alleman, 1991). The official curriculum is recognized as an intended, written, or planned curriculum which is represented in the form of a curriculum document, syllabus, teacher's guide, textbook, or workbook. For Marsh and Willis (1999), it encompasses the curriculum in plan, enactment, and experience. The planned or official curriculum is enacted and experienced in the complex context of a classroom. Aoki argues that the classroom curriculum is a process of the tensioned interplay of a plan and lived experience dynamically (Aoki, 1999). The dynamic interaction leads to the classroom curriculum being enacted with the teacher's pedagogical practice or classroom instruction. This shows that classroom curriculum and pedagogy are intertwined processes (Miller, 2004) in practice. In this sense, it is assumed that classroom teachers are informed about the pedagogical behaviors or activities prescribed by the official curriculum.

In Nepal's school curriculum system, the official curricula for grade 9 have prescribed lectures, question-answer, demonstration, experimentation, discussion, field study, and project work instructional activities for science education (CDC, 2014) and, for social studies subject teaching, there are lecture, question-answer,

problem-solving, observation, role play, experimentation, inductive inquiry, demonstration, discussion, discovery, project, field trip, case study, and critical thinking as intended activities (CDC, 2014). In this context, it is expected that the instructional behavior of the teachers would intertwine with the curriculum and classroom instruction pragmatically. Lambert (2018, p. 357) stresses that "a crucial focus must be on the teachers and their agency to enact a curriculum." Hence, in this research, the teacher research participants were encouraged to share the perceived intersection of their instructional behavior with the curriculum dynamics. In this regard SStMPN shared his experience that "teachers have not received the curriculum currently. However, we have been adjusting the teaching as per the teaching hours allocated in the curriculum and the TG".

.Another teacher who managed the curriculum by himself had the experience using information and communication technology to be informed about what to teach or the contents to be taught. SciPMB, a science teacher, who downloaded the curriculum from the CDC website, shared his perception that the science curriculum seems to focus only on theoretical teaching rather than the time-consuming practical activities like laboratory work. The time weightage allocated in the curriculum is not sufficient if the practical works are carried out. Expecting more specificities for practical work, he said:

I think it should be clearly stated in the curriculum to make practical work, field trips, and other activities obligatory. There should be a provision for an external evaluator to evaluate the final practical activities. There is no monitoring system to check whether the practical activities are taking place or not. So, they are obliged to carry out the work. The field trips are organized but there is no relation with the curriculum intent, nor do the students prepare any reports.

The teacher's view evidences that the teachers are informed about the contents of their subject curriculum but not about the pedagogical intents and prescriptions given in the curriculum. Though the curriculum and TG are prepared for instructional guidance, it shows that teachers' classroom instructional behavior is not exactly technically aligned with the specific prescriptions given in the curriculum plan and the TG prepared at the national level or general level. The curriculum plan and TG intend a planned and systematic instructional behavior that is being resisted by the local complex classroom system context co-created by the associative interaction of human, system, and resource factors. This reveals nonlinear relations and interaction between curriculum policy and plan as a macro system in a text and classroom curriculum enactment/practice as a microsystem in a context.

Limitations of Local School System

Teachers' instructional behavior constantly interacts with the context of the particular school classroom system. The school context has the potential of proximal dynamics to the teacher's instructional activities. This is characterized as an evolving complex system comprising micro-operational policy and plan and their immediate enactment through a human role, responsibility, activity, and relation interacting with physical infrastructure, instructional materials, instructional time, and instructional systems. A teacher is at the center of this contextual microsystem and is an actor and, at the same time, a perceiver who has perceptions, experiences, and information about the enactment of classroom behavior. In this study, the teachers expressed that time is a constraint to carry out the activities besides the lecturing activity. For instance, SStMPN said, "We are under the compulsion of time constraints to complete the course on time. Other methods take time a lot. The main thing is time". He sees a

crucial role of school administration in classroom behavior management through policy formulation at the school level. Sharing his perception, SStMPN said:

The school administration in our school is not strict. So, the students have been rude in a manner that has obstructed our classroom delivery to perform as it is expected. The main thing is school administration. The district administration is related to the matters of the teachers. The school administration is there. It would be better if the school administration controlled the students' unnecessary activities and initiated rewards and punishments for teachers.

Another research participant, SciPMB, teaching science in grade 9 along with the responsibility of the headteacher, or a school administrator, of the same school had the experience of difficulty in carrying out the instructional activities properly due to time constraints to carry out the instructional activities. He indicated the unresponsive interaction of policy dynamics with the complex microsystem of a school in practice:

The structure of the classroom routine has to be changed. In the current routine, students have to learn seven/eight subjects in a single day on the one hand, on the other hand, the teachers must finish the course within the given timeframe. So, students do not have sufficient time to practice the activities and teachers do not get the required time to deliver the content of a lesson within the allocated forty-five minutes either. This routine structure might be a barrier to getting students involved in activities, observation, and field trips. So, time allocation for all these activities should be in the curriculum to enact them accordingly in the curriculum plan and purposefully in learning.

His lived experience-based information shows that there is two-way influencing feedback of the macro and micro instructional systems, text and context, or policy and practice. As he said, the present activity practices indicate chaos. He shared his perception that "we take students on the educational tour which is just for entertainment. There is no relation with the curriculum. In some cases, the school takes the student's picnic in the name of a field trip". Hence, the teacher's instructional behavior is being adapted to somewhere in order and chaos. Behavior adaptation is a process of learning occurring on the edge of chaos, where a delicate balance must be maintained by the teacher between too much and too little structure (Fullan, 2005). The too much-structured system dictates authoritative order and, in contrast, the too little-structured system creates chaos in instructional activities. In this circumstance, aligning towards an either-or stance promotes nonpragmatic and incompatible instructional behavior.

The third research participant SStKD, who was a teacher of social studies teaching in the secondary level and headteacher as well, was found to be a strict, influencing, and enthusiastic school administrator. As I observed the school library, it was resourceful and well-managed. As he said other schools are also learning from our way of library management. However, the library visit, study, and research were found not to be included in the school's instructional schedule. He shared the library using practice as "there is a schedule for lower classes. But for the secondary level, there is no schedule. For grades 9 and 10, if they have a leisure period, they visit the library". This shows that it is yet to connect the library system firmly as a component of regular learning space for the students. Similarly, though, there is an evaluation provision for lab practical activities in the macro or intended curriculum and plan, school science lab activities have not been included in the micro-instructional plan to

utilize the available science lab and equipment. SciPMB said, “There is a provision of practical in science nowadays, but it was not in the past”. In his perception, there is no impact of the provision on the laboratory instructional behavior of the teacher. This indicates that there is an interactive connection between instructional behavior and the monitoring system. He further stated, "There is no monitoring system to check whether the practical activities are taking place. The monitoring system would obligate the teachers to carry out the practical work".

In conclusion, the school context is the system that reveals complex junctures of dynamics of classroom behavior systems. It is found that instructional behavior is strongly influenced by proximal forces rather than distal dynamics like national and regional policy and plans. So, the behavior lies at the edge of chaos.

Influence of ICT Technological Advancement

The National ICT Policy, Nepal (MOEST, 2015) and the widely spread ICT usage in society have aroused enthusiasm in classroom teachers. Their impact on the school system was noticed through general observation. Technologically, the infrastructural context of the school systems has been extended with internet facilities, smartboards, and computer labs. During the interviews concerning the use of instructional materials, the teachers talked about the ICT instruments enthusiastically. One of the teacher interviewees, SStMPN, said:

Of course, there are new technologies. But we haven't been trained yet about how to use them, sir. We haven't been very advanced in using multimedia. We are not technology-friendly. So, we use available general instructional materials and materials made by ourselves.

In conjunction with the changing technological environment of the school, teachers had a deep interest in transforming their instructional behavior by integrating

the ICT instruments available to them. SStKD, a teacher with headteacher responsibility of the school, shared the perceived change occurring in the school classroom:

All teachers commit themselves to using new methods and techniques. In most of the classrooms, there are projectors. In the upper classes, they are in use. However, in the lower classes, teachers are yet to be trained in ICT skills to practice in the classroom.

This shows that traditional instructional materials are being gradually replaced by ICT materials. SciPMB, a teacher, whose school had no lab room and sufficient science practical equipment shared his experience of enacting practical activities by using ICT materials. He shared his experience, “Sometimes, handy equipment like a microscope, specimen, etc. is taken to the classroom to demonstrate. I use the smart mobile phone as well to show them science practical activities taken from the Google World”. This evidenced that teachers are interested in changing their instructional behavior by integrating technological instruments available to them. During the interview, he further talked about the technologically changing context and facing barriers, “The classroom should be made ICT friendly. The government has also supported us by providing devices. In the case of our school, we need other infrastructure and support systems like lab room, teachers, maintenance expense, etc.” In Nepal, this is, of course, a representative case of the school infrastructural contexts to meet a complete foundation for an ICT-enhanced school environment and enactment in everyday instructional behavior. Hence, the school-situated context dynamics are found strong to influence classroom behavior to transform and make the desired behavior sustainable.

Formal Knowledge and Skill Background

Teaching is a formally learned profession (Shulman, 1987) to be enacted in a specialized school classroom context. It is regarded as a formal and responsible educational task characterized by a knowledge-based activity (Hegarty, 2000) and skill-based behavior. The teachers encounter the school and university education courses and teacher education courses before initiating classroom teaching or, if not, it happens at the beginning of their teaching career. The focus of the courses is to develop teacher knowledge of instructional content, general pedagogy, pedagogical content, curriculum, educational end, and philosophies (Shulman, 1987). Tribhuvan University is one of the universities of Nepal that is preparing trained and competent teachers for all levels of the education system equipping them with professional knowledge for the last six decades (Faculty of Education, n.d.). The prospective teachers are expected to enact their content and pedagogical knowledge and skills competently. The educational policy spells that the Bachelor's Degree in Education with a relevant subject specialization or, if it is not, a Bachelor's degree in the relevant specialized subject area with ten-month teacher training is the minimum academic and professional qualification to be a secondary-level school teacher in Nepal (HLNEC, 2019; MOEST, 2019). The classroom instructional behavior is regarded as an outcome of the formal antecedents, like, content and pedagogical knowledge of the teacher. The classroom behavior of a teacher is assumed to be practicing the learned knowledge and skills of the university education. According to Hegarty (2000), it is the teachers' responsibility to translate the learned knowledge and skills into classroom behavior. Based on the shared accounts, I have, here below, analyzed the impact of the content and pedagogical knowledge and skills on the teachers' instructional behavior by presenting the teacher's lived experiences.

Evolving content knowledge behavior of the teacher in practice. The content knowledge is perceived as the intersection of the teacher's formally learned course in the higher education and school curriculum to be taught. Talking about the science and social studies curricula of Nepal, the designs of the curricula are based on a broad-field approach that integrates many distinct subject areas into a single curriculum (Ornstein & Hunkins, 2018; Print, 1993). This design implies that a teacher's content expertise embedded in his verbal behavior is to have responded to the wide and complex combination of content areas covered by the subject. In this context, this researcher interviewed four teachers to explore the lived experiences they had. One of the research participants, SStMPN, teaching social studies subjects shared his content knowledge background based on the university study that:

I studied Intermediate of Arts (IA) with specialization subjects in Geography, Mathematics, and Nepali. After the result of the IA examination, I joined Ratna Rajya Campus, Kathmandu for a Bachelor of Arts degree. In the meantime, right after completing my BA first-year study, I got an opportunity to join this School for teaching.

As he shared, he continued his teaching career along with his higher education studies. Eventually, he completed his study with a Master's Degree in Sociology. In the beginning years, he had to teach three and sometimes four subjects due to the lack of teachers in the school. He shared his story from his classroom life "I taught Nepali, mathematics, social studies, and geography, four subjects for a long time, in different situations". Later when his school managed the subject-wise teachers, he was assigned as a social studies subject teacher. Now, it has been one and a half decades since he has been teaching this subject. The accounts shared by the teacher show that he was not from an educational background and the university subjects he was

exposed to were not consistent with the school social studies subject content areas. Only geographical content is supported by the content areas learned by the teacher in the university program which covers only one content area out of nine content learning areas of social studies (Content Areas of Social Studies, see Appendix Q).

Another research participant, SStBCG, had also a similar academic background rooted in humanities rather than education. He recounted the university subjects he had studied before joining school classroom teaching:

My major subjects at the university were English, political science, and history. The rest of the subjects were compulsory. I had passed I. A. from the campus. After that, I did not join the campus for nearly two years. I went back to my home village to help with house construction. Then, I came to Kathmandu in 2003. I joined Tri-Chandra Campus for a Bachelor of Arts (BA). My major subjects were English and sociology in the study. In the same year, my teaching career started.

This shows that the content knowledge background of teacher SStBCG matches only with two content areas of the social studies subject curriculum of grade 9, while it contains nine content areas to be taught. The shreds of evidence inform that there is an inconsistency in the teacher's formal knowledge systems between those acquired from the university classroom and those being practiced in the school classroom. Similarly, another research participant, SciPMB, who was academically exposed to the general science program as per the faculty of science rather than the faculty of education, shared his lived experience:

I studied science in intermediate (ISc). The score of the ISc was not so high. So, I could not get admitted to Engineering and Bachelor of Medicine and

Bachelor of Surgery (MBBS). I had to join a BSc For this study, I went and joined Tri-Chandra Campus. I studied Biology there.

He further shared the difficulties encountered in the classroom while dealing with the content areas he did not know, "Chemistry was difficult. In this subject, the periodic table is difficult for me. The electronic configuration is difficult." SciPMB further added that he had not studied chemistry and physics subjects at that time but he had to teach them in the school science. His experience tells that the content knowledge gained from a single subject content knowledge is too limited to respond to the intended content knowledge of the school science curriculum which is based on the broad-field design of physics, chemistry, biology, geology, and astronomy subjects. Hence, his instructional behavior was severely crippled by this feeble content knowledge that compelled him to learn additional content knowledge from the TPD training. SStKD, another interviewee, was a teacher of social studies subject teaching in grade nine and was from a pedagogical education background. Despite this, his specialized study in higher education was English teaching.

In conclusion, formal knowledge for school-level students has been organized based on broad-field curriculum design. The teachers who enter the teaching profession with a single subject content knowledge of higher education encounter a mosaic of curriculum contents derived from different academic disciplines or fields of study. This situation implies that the teachers should be engaged in building content knowledge to meet the requirements or the intents of the official curriculum. Hence, there is a complex interaction among the teacher's knowledge background, curriculum intended content knowledge, student content knowledge background, and teacher's developing content knowledge. Furthermore, it also indicates that the integration of content knowledge and pedagogical knowledge is many yards away from practice,

What lies at stake is that the teacher's learned pedagogical techniques are the means to carry out the learned content knowledge in situ.

Learned pedagogical knowledge and skills in classroom practice. The learned pedagogical knowledge and skills of a teacher are at the heart of the teaching profession. It embodies conceptual, declarative, and procedural knowledge which deals with instructional methodologies. The methodological practice of a teacher is expected to be influenced by the courses experienced by the teacher in the process of becoming and being a professional teacher. However, pedagogical techniques alone without association with the subject matter cannot come into classroom practice which is revealed in the specialized subject teaching courses in the University and school subject curricula and subject-specific teacher's guides. So, in this research, the teachers representing science and social studies subjects of grade nine were interviewed to reflect on their pedagogical content knowledge practice in a classroom context. A social studies teacher identified with SStMPN expressed his experience with his pedagogical knowledge background:

To be a trained teacher, there was a provision of a one-year BEd or a ten-month training program. I had joined a one-year B.Ed program with a mathematics specialization and attempted exams two/three times. But I could not pass the exam. At the same time, I completed Ten-month Teacher Training. So, I gave up the study. Because it was not necessary. The training was a sufficient requirement for professional eligibility.

It shows that he started his classroom teaching profession before his interface with the teacher development initiatives. Conceptually, the initiatives would consist of pedagogical knowledge and pedagogical content knowledge bases for teaching (Shulman, 1986, 1987). For the teachers who joined teaching without this professional

knowledge, a ten-month in-service secondary teachers training was provisioned to develop additional content knowledge and pedagogical skills in them (NCED, 2004b) in their early career. SciPMB, another research participant with a similar background in professional entry, shared his lived experience about building pedagogical knowledge in his beginning career. He said "while talking about methods, we had learned from one-year B. Ed. In the curriculum paper, the teaching methods and ways of planning lesson included". He added, "There were three basic papers-educational psychology, sociological and philosophical foundations of education, and curriculum and evaluation; and two specialization papers for the educational administration study". This shows that the teacher got knowledge of pedagogical foundations and general pedagogical knowledge from the foundational courses. However, the knowledge acquired by the teacher through the educational administration course is irrelevant to the content knowledge he was practicing. This disintegrated background knowledge on pedagogy and content implies less support for the practice of instructional behavior in enacting the intended pedagogical content knowledge specified in the written school curriculum.

The teachers' perceptions of the courses they studied and their classroom teaching experiences suggest that they perceived ten-month in-service teacher training and its alternative one-year B. Ed. program provisioned for teacher professionalism as a requisite for legitimatizing their teaching profession; rather than founding pedagogical content knowledge and skills to transform their existing non-scientific concept, a "spontaneous concept" termed by Vygotsky (2012, p. xviii). As a result, this complex interaction of the concept of teacher and the disintegrated relation of pedagogy-content knowledge hardly influences the teacher's instructional behavior linearly.

SStKD was a social studies teacher whose academic background was throughout the pedagogical education program. Despite this, his subject specialization was English teaching education rather than social studies teaching education. He shared his experience related to the instructional human resource context of the school system which made him compel to take responsibility for teaching social studies:

When this school upgraded and started to run the class of grade 9, I fell into the trap of teaching social studies. Because no one was interested in teaching this subject. So, I took this responsibility. It was in the English medium, so it was difficult to teach for any teachers in community school systems.

His experience suggests that Nepal's community schools began shifting instructional mediums from Nepali to English regardless of the contextual challenges. The human resource dynamics of a school system is an unavoidable causal factor for allocating classroom instructional responsibility to the teacher. The community school system's move to shift to the English medium can be taken as a historical landmark in terms of instructional medium. This evolving instructional language practice, despite the government policy preference for the Nepali language, is to respond to the parents' aspirations for English and to counter the English medium private school system. The space of this evolving language practice is justified by the lived experience of SStMPN, a social studies teacher teaching in the Nepali medium. He stated "there were many students in the past. By 2000/2001, when the boarding school system emerged, since then the number of students has been gradually decreased. Otherwise, there were students full of the classroom capacity". He further communicated his perception about the parents' aspiration and school human resource context for adopting English medium instruction that:

The parents want their wards to be taught in English. However, the public/community/government schools had not adopted English medium instruction since the very beginning. It was difficult to follow the English medium for the old teachers and we could not compete with the private schools.

This perception of the reason for adopting English instructional medium in the community school system reveals that the school-situated instructional human dynamics lead to the classroom instruction at the edge of chaos due to the lack of integration of “Pedagogical Language Knowledge” (Galguera, 2011, p. 86) and content knowledge bases of an assigned teacher to carry out classroom activity in English medium instruction for social studies and other similar subjects. The problem is that the teacher with an English language background may not have content and pedagogical content knowledge of subjects like social studies. In this context, the English language knowledge acquired and the subject content knowledge to be taught, do not have a natural integration in classroom practice without they are already treated through a teacher development education program. For instance, SStKD was a graduate in education, he got knowledge of general pedagogy, curriculum, educational psychology, and educational philosophy which embodies general concepts, perspectives, and theories, rather than concrete and practical knowledge. However, he was not exposed to the pedagogical content knowledge of social studies. This knowledge would play a pivotal to activate the inert curriculum and the teacher's instructional behavior. So, he claimed that “our teaching is being carried out in the periphery of the methods learned from college education” is found in practice.

He sees a relationship between higher pedagogical education theories, methods, and concepts and classroom teaching. He hinted that "there are link-

ups with theories and methods studied in college. In my class, I use inductive and deductive methods. In the upper class, deductive methods are used.” These concepts are general pedagogical principles derived from the higher education background. The teachers' experiential evidence shows that the influence of such university pedagogical knowledge and skill on their school instructional behavior is hard to specify linearly. The translation of the abstract and macro symbolic knowledge system into the microscopic behavioral actions is the consequence of the complex interaction among the symbolic knowledge, the teacher's cognitive process, the agency, and the school classroom context. However, responding to a question concerning his learning about pedagogical skills he was using to engage his students in their project work reports, he said that he learned such skills from university courses.

SciPMB, a science teacher had a similar experience to share. He used to urge the students to prepare case study reports, instead of science lab work (practical) officially provisioned as he stated “I give case study tasks for the assessment using my knowledge of case study and report writing learned when I was a college student”. His experience implies that some teachers' specific pedagogical knowledge and skill backgrounds make an impact on their instructional behavior if it is supported by contextual system dynamics like time, resources, human interest, and assessment criteria. Furthermore, the project work report is an officially provisioned student assessment criterion to be enacted by the social studies teachers. In contrast, although the laboratory work is provisioned in the science curriculum and teacher's guide, the subject teacher was found to give written assignments to the students instead of practical

assessments in the lab. This indicates a non-linear interaction between the policy dynamics and the teacher's instructional behavior.

In a nutshell, classroom instructional dynamics derived from the teachers' lived perceptions and experiences are numerous. In the passage of chronosystem, intergenerational dynamics matter for the transformation of instructional behavior in the classroom practice. The changing macro policy system regulates the instructional system recruiting professionally trained and educationally updated generations of teachers which have replaced the teaching context of the subject irrelevant and pedagogically strange teachers. The policy and directives have also changed the teaching context from rote and rote learning to student-initiated learning that prizes student agency. Unlike that, the classroom instructional behavior has revealed not a substantial difference between the pedagogically treated and not treated, as well as, content relevant and irrelevant teacher generations' behavior despite the macro instructional policy changes and intents. Their behavior is found to be bound to teacher-dominant activities and mostly stuck to the lecture method establishing a tacit culture of transmission of *the guru* style of instructional practice. The new generations enter the teaching profession with relevant pedagogical content knowledge and professional enthusiasm but the workplace context is not likely to stimulate their pedagogical content procedural knowledge and skill to use and transform the prevailing behavioral practice. Ultimately, the established practice system makes the new teacher adapt his/her instructional behavior. Though there is no substantive generational difference in soft pedagogical behavior, a difference in ICT-based pedagogical behavior exists. The newly recruited young teachers and career beginner teachers are more excited to make their instructional behavior ICT-based than the teachers from former generations and those who seem to be professionally stagnant.

The process of reflective practice is assumed to be a powerful dynamic to change the teacher's instructional behavior in the professional life. The evidence in the teacher's professional career stages indicates, pedagogically, there is no difference between teaching as a beginner and as an experienced teacher in terms of instructional pedagogical behavior. The difference is only in content mastery, preparation time, and delivery confidence. In the beginning, the teachers tend to spend a lot of time on content preparation before entering the classroom to show content mastery in front of students and other teachers, who are directly or indirectly concerned about the new teacher's instruction. At the experienced stage, the teacher spends the least or no time on content preparation. In both stages, the teacher's instructional tool is mostly lecturing. In the latter stage, one employs some other teacher-centered activities. Student satisfaction and parents' marks expectations are major dynamics that determine patterns of transformation of instructional behavior. The aforementioned dynamics are closely interacting dynamics with the micro-school system and embedded professional capitals which stimulate, whether or not, to make professional decisions for the transformation of instructional behavior.

Teacher training is an instructional dynamic that is expected to intervene in the teacher-centric teaching tradition and to transform classroom practice shaping classroom instructional behavior. The training becomes a useful device for the teachers, who come from a non-pedagogical education background, to understand the teacher's role and to learn general pedagogical techniques and content-specific pedagogical skills. In this context, the learned skills that respond to the teacher's hot need can be naturally adapted to the instructional behavior. Generic, theoretical, and content-focused teacher training is likely to be rare or does not influence instructional behavioral transformation. An alternative to the teacher training approach, the CPD

was introduced through the complex systems ecology of the federal system. In the analysis, it is also found to be crippled by complex systemic difficulties i.e. loss of effective systems to supervise and monitor teachers, lack of resources to support local activity, only partial devolution of responsibility to local government, lack of well-defined roles, limited involvement of EDCUs, de-prioritization of education, and lack of trained officers (Borg & Vertex Consult, 2023). These show that the CPD itself has been dysfunctional in supporting the instructional transformation.

The intent of the university education program intersects with the teacher's disposition, cognition, and behavior. Although the teacher education program and courses are logically prepared in a consistent and relevant manner with school education program and curriculum to ensure quality teaching, the inconsistency, and fragmentation, if any, in the content knowledge and the pedagogical knowledge and skills of teachers have poorly oriented the teacher's behavior enacting the instructional activities prescribed by the official school curriculum. Similarly, the legitimacy/formality conception embodied in teachers towards the teacher development program/training often disorients the teacher agency for the enactment of the inert pedagogical content plans through the teacher's instructional behavior.

Although several dynamics are interplaying with instructional behavior, the behaviors expressed in the form of verbal and nonverbal activities with roles and relations are inevitably shaped by the proximal dynamics of the school-situated complex-micro system (Bronfenbrenner, 1979). Very few discrete instructional behaviors, like letting students be involved in project work and report development, are linearly practiced in line with technical rationality to respond to the student assessment requirement, rather than as purposeful instructional activity that is obviously intended by the pedagogical courses and discourses. Similarly, classroom

behavior is the consequence of a complex interaction of university content knowledge and pedagogical knowledge of the teacher, curriculum intent and design, official instructional prescriptions and mechanism, school classroom policy and contexts, and style of teacher's cognition. It is revealed that the limitation of instructional time, student characteristics and background, and the conventional infrastructure and classroom settings are directly involved in the dynamics of instructional behavior. In such an interactive context, the influence on behavior linearly from single dynamics like in the rational model is likely to be nonexistent. Therefore, linear transformation across intergeneration and professional stages of pedagogical instructional behavior, and the pedagogical content knowledge-based behavior face complex resistants evolved from complex dynamic systems. This informs that instructional behavior (teacher and student behavior) is a systemic phenomenon with the process of adapting and, as well as, evolving in the dynamic course of the instructional chronosystem.

Chapter Six

Discussion: Integration and Interpretation of the Findings

This chapter is to establish a dynamic relationship between research questions, research findings, and theories in the interface of conceptual and theoretical frameworks. Operationally, this involves the integration of quantitative research results from [Chapter Four](#) and qualitative research findings from [Chapter Five](#) to develop a holistic and deeper understanding of the classroom behavioral phenomenon; interpretation of the nature of classroom behavioral phenomenon by using assumptions of the CDS theoretical framework; and justification of the stated conceptual framework of this study. The findings from both types of research have been integrated under each theme. The themes are abductively constructed by interpreting the quantitative and qualitative research findings.

Classroom Dynamism: Anticipated and Actual Behavior Change

Anticipated classroom change is rarely revealed in the actual practice. Instructional anticipation and reality in the classroom reveal an engaged tension in the field of study of classroom pedagogy. Though the classroom is a system-governed learning space where teachers and students are expected to enact formal behavior of having policy intervention and deducing theoretically earned knowledge and pedagogically learned skills, the instructional practice is not as anticipated. The macro rather than micro policy intent or theoretical content is one end, and the practice is the end of the same behavioral phenomenon. In this sense, instructional behavior is always at the edge of science and art, theory and practice, or policy and enactment. It is a reflective praxis of predictability and unpredictability.

The systematic classroom observation results revealed unpredicted practices of the instructional policy and transformation discourse. In this context, the study results

on the present classroom instructional activities show that, though the instructional policies and theories intend to be student-centered, the teacher-centered instructional behavior, including lecturing (72.13%), and silence/havoc (5.15%) time occupied most of the classrooms time in science and social studies, whereas student-centered activities namely, group work/project work (1.16%), student demonstration and presentation (1.77%), library research and field reporting (.00%), student speaking (6.66%), teacher questioning (2.95%), notebook work (9.19%), teacher demonstrations and audio-visual use (.82) were practiced less dominantly in terms of time occupation of the categories of activities. In terms of the ratio of student activities to teacher activities, it is .13 in science and .11 in social studies. This informs that students are very rarely given space in classroom activities. The prevailing macro instructional system including instructional aspiration reflected in commissions' reports, policy, program, and discourse has a weak influence over the classroom behavioral activities to transform instruction into student-centered which was anticipated.

The explicitly spelled-out macro policy system is resisted by implicitly institutionalized content mastery or content-centric instructional behavioral practice that diverts the course of pedagogical transformation in practice. In the instructional behavioral practice, Kumaravadivelu's (2001) post method pedagogy matters particularity, practicality, and possibility of the instructional activities in behavior to respond to the complexity sensitivity. The macro instructional program is a general philosophical, belief, and agenda-loaded program that is likely weak in context sensitivity and enhancement of the instructional behavior transformation in practice in a micro systemic context. In the context of Nepal, content-driven or content knowledge-focused pedagogy, rather than content pedagogical knowledge-focused

pedagogy, relies on the official curriculum content and single official textbook, which emphasizes teacher's content delivery and teacher centered activities. This pedagogical practice discourages student participation in knowledge construction, hands-on learning, learning style, individual differences, individual and group work, and interaction.

In the theoretical background of chrono-ecological systems, the dynamism of the classroom behavior in this study is broadly set up in the context of historical antecedents, theoretical assumptions, and policy intents. From the linear systemic notion, the change is expected to happen sequentially stage-by-stage development process from the dome [*Guru Aashram*] stage through formalistic, transitional, to meaning/progressive stage of the education system over time in an evolving nature as postulated by Beeby (1966). As the prescriptive assumption of this theory, the teacher training and education and instructional activities were placed at the core of this theory to assess the development stages which implies interpreting the change in the classroom instructional behavior across the chronological time of the Nepali school system.

In the classroom pedagogical context of Nepal, the NESP was a landmark education plan for pedagogical transformation. However, it was not explicit on classroom pedagogical approaches. However, its emphasis was on improving teaching methods for each subject by introducing scientific methods (MOE, 1971). By 1974, at the end of the NESP, Pfau's study on teachers' behaviors showed that Nepali schools were at a formalistic stage in terms of classroom behavior (Guthrie, 2018). For Beeby (1966) the behavior evolves through the systemic context with ill-educated and ill-trained teachers and teaching with limited meaning, rigid syllabus, one-way and rigid methods, one textbook, tight discipline, heavy memorizing, and ignoring emotional

life. Beeby's theory stimulated the hypothesis to test classroom behavior change from a linear systemic perspective. Like criticism from Guthrie and other researchers, the classroom activities found in this study indicate classroom instructional behavior is not being linearly changed to the meaning/progressive stage. Rather, this study explored the facts and made researchers realize that the school classroom in developing countries is a complex dynamic systems context. Later, he stated that the administrative mechanism for controlling flow is complex due to the political, social, cultural, financial, and educational grounds of a country (Beeby, 1980). However, Beeby's educational development stage theory and Guthrie's critical understanding of progressivism in the developing country do not ignore the classroom instructional transformation from teacher-centered to learner-centered where the essence of educational policy, plan, and program is found as constant transformative dynamics.

Nevertheless, the quantitative research result of this study shows that the reality of the transformation of classroom behavior is found not to be exactly intended and assumed. This study shows the ratio of classroom student activity to teacher activity in science is .13 and in social studies, it is .11 in 2022; while it was .09 and .08 only in 1974 (Pfau, 1977). It is a meager change. The macro and linear instructional system has not pedagogically transformed the instructional behavior across the professional career stages of a teacher and the intergenerational succession of the teachers as well. The meager transformation that occurred is completely inconsistent in relation to the policy intents and theoretical orientation. Critical reflective pedagogical behavior could compensate if teacher agency associated with the 'I' self-identity becomes active. These statistical results inform the absolute relation of the macro-micro instructional systems or theory/policy-practice relation

and, Beeby's (1966) stage-by-stage linear thesis of transformation is dysfunctional in the complex dynamic systems.

The NCF (CDC, 2019) intends to diversify classroom activities and facilitate the behavior of classroom teachers. From the policy intents at the macro instructional level, the change seems to be happening in the behavior of the teachers (CDC, 2014, 2017a, 2017b, 2019) and it indicates the characteristics of the 'stage of meaning and progressive level' of education (Beeby, 1966; Guthrie, 2018). A recent approach, teachers' professional development, is a policy effort made by UNESCO (Villegas-Reimers, 2003) and ADB (Pillay et al., 2017) and school sector reform plan (MOE, 2009) and the SSDP-2016-2023 (MOE, 2016) at the national level to transform teachers' classroom practice into meaning or progressive stage. The study conducted by Poyck et al. (2016) about the effectiveness of the SSRP found that weak teacher development, lack of intrinsic motivation due to the low social value of the teacher profession, quite rare supervision within the school management system, and lack of pedagogical devices with teachers which seem barriers in classroom behavior transformation. Furthermore, the SSDP adopts the framework of the theory of change model to make a holistic change in the school sector (MOE, 2016). As a consequence, the NCED (2015a) claims in its progress Status Report-2015 that all school teachers are trained but the absolute or linear impact of the training on teachers' behavior could not be found in this research. The SSRP, SSDP, and SESP are the macro policies and plans that are likely ignoring the instructional behavior occurring at the micro, process, and complex levels. In this pedagogical context, a pragmatic meaning of instructional behavior is constructed in scholarly work interpreting the intersection and interaction of the macro (instructional policies, theories, assumptions, etc.) and micro (local school) systems including other instructional systems within the CDS

framework. Dynamism is the central process of the CDS theory (Larsen-Freeman, 2015; Mahmoodzadeh & Gkonou, 2015) that implies investigation of differences in the instructional behavior of the teachers in the present and past classroom. The concept of dynamism, in the classroom context, refers to a change (Byrne, 2014; Larsen-Freeman, 2015; Mahmoodzadeh & Gkonou, 2015) in instructional behavior which was tested through quantitative research findings. The quantitative research findings of this study showed that the nature of the instructional behavior is found in the forms of non-existent, constant, reversing, transforming, and non-oriented (ICT blended) change that reveals complex dynamism rather than linearly predicted, intended, and assumed transformation.

Evolving meaning of instructional behavior. Behavioral dynamism is an intertwined process in the interaction of dynamic systems. The discussion that follows is centered on dynamics-interaction-dynamism implies this discussion. In this sense, behavior dynamism is a consequence of the interaction of dynamic systems. The strength of the interaction of the dynamics is not a constant phenomenon; it changes over time (Mahmoodzadeh & Gkonou, 2015). Ultimately, it implies a noble orientation to an understanding of classroom instructional behavior embedded in the complex dynamic systems which signifies conceptual deconstruction of the linear systemic understanding of instructional behavior. Hence, the pragmatism that underlines this study informs the interpretation of the research results from instructional provisions and multiple theories embedded in a complex theoretical framework and to make meaning of classroom behavior synergically.

Categories of Instructional Behavior with Their Dynamics

The roles of instructional systems' dynamics are inevitable to the behavior practice in the complex context. In the complex dynamic context, classroom

behaviors are found intertwined with multiple systemic dynamics. The research problem undertaken in this study was the classroom behavior phenomenon which is represented by a set of classroom instructional behavior categories- laboratory work, group work/project, individual practical activities, student demonstration and presentation, student library and field trip reporting, a student speaking, teacher questioning, notebook work, teacher demonstration, and a teacher lecturing which are discussed as instructional systemic entities. The change found in the occurring time of a particular activity during the span of life of the classroom instructional system informs a kind of pedagogical transformation, i.e., from teacher-centered to student-centered, teacher-initiated activity to student-initiated activity, teacher authoritative to student autonomy, teaching to learning, one-way interaction to two interaction, content-based learning to activity-based learning, lower order thinking instructional strategies to higher order thinking instructional strategies, etc. Many program interventions have been attempted to transform classroom instructional behavior. This study found complex causal consequences reflecting the uncertainty of instructional behaviors in the context of complex dynamic systems. The change of instructional behavior categories measured by using descriptive and inferential statistical instruments is characterized as non-existent, constant, reversing, transforming, and non-oriented behavior categories. The interacting dynamics of each behavior category found through the qualitative inquiry are discussed below.

Null/Nonexistent instructional behaviors. Null instructional behaviors are those that are overtly and officially defined and prescribed in the instructional policy dynamics like curriculum documents, syllabi, and teacher guides but they were not seen to be in practice in school classroom contexts. The science library (unstructured/open) and science or social studies library research activities and field

trips are the two instructional categories that were and are with zero practice. In the research conducted by Pfau (1977), by the end of the NESP, the unstructured laboratory experiment activity in science and library research and field trips reporting in science and social studies were found not in practice in the secondary school classroom. The present study also shows that the students are not involved in laboratory experiments in science. This means there is no difference in the instructional behavior of the teachers in the past and present in terms of laboratory use.

Interacting dynamics of the unstructured laboratory work. Laboratory work is the science subject-related instructional behavior category. This category implies a student-centered (Caldwell, 1971; Pfau, 1977) and student's hands-on activity and learning by doing. Despite the policy provision specified in the written curriculum, activity-based pedagogical discourse and BEd Science education program contents, the science teachers' instructional behavior in laboratory use (unstructured), or students' hands-on lab work is not in practice. The comparison of the studies, the research finding by the year 1974, that is the later year of the NESP period, with the finding in the year 2022, shows there is no change in laboratory work practice in the Grade 9 science instruction.

The science teacher who spends most of his time in science classroom instruction is a source of rich information about the laboratory work situation. As experienced by the science teacher, being a secondary school student and then being a professional teacher, there has been no significant change in laboratory work activities for the 48 year long course of time. In the perception of the teacher, an inconsistency between the daily routine prepared by the local school system and the written curriculum prepared by the CDC comprising subject specialists and curriculum

experts does not seem to stimulate the teachers' laboratory work. On the other hand, the teachers are least interested in obtaining the curriculum plan and TGs; and in being informed about the activity specifications given in the documents. Like the research finding of Ottander and Grelsson (2006), in the context of Nepali school classroom contexts, the teachers have to cover too much content to fulfill the curricular goals within the officially planned working days in an academic year which is unlikely favorable to the open laboratory work. As communicated by the teachers, other confrontations faced in enacting laboratory work are “lack of materials and equipment” (Hamidu et al., 2014, p. 84) and physical infrastructure. In some cases, as research findings reported by Hamidu et al. (2014), the science practical materials and equipment are locked up in the school laboratory room, rather than used in instructional activity.

Laboratory-using behavior theoretically intersects with the pedagogical content knowledge and skill (PCK&S) background of the teacher, since it is based on procedural knowledge for performing the skill-based behavior. Hence, it is a system of the academic cognitive process of the teacher that evolves through the learning opportunity under the teacher development programs of the faculty of education, B. Ed. science education consists of laboratory work for potential teachers (FOE, 2015). It matters in teaching school science subjects. The teacher's cognition (PCK&S) lies behind teaching behaviors (Lyu & Chen, 2021). It implies that insufficient content knowledge and laboratory skills and the disintegrated content and pedagogical knowledge backgrounds of teachers disorient the laboratory using the agentic behavior of the teacher. In conclusion, although laboratory work is an integral and essential pedagogical activity for the science curriculum (Odubunmi & Balogun, 1991), it seems unlikely to be integrated into the science teacher's everyday

instructional activities due to the lack of sufficient equipment and laboratory infrastructure and micro policy and plan at the local school system.

Interacting dynamics of the student library research and field-trip reporting behavior. Library research is an instructional category in which a student or group of students are allowed to present an oral report based on reference material studied in a library room or the classroom (Caldwell, 1971; Pfau, 1977). By the latter year of the NESP, in 1974, the instructional activities related to student library research/study as well as a field trip and their reporting in the classroom were not in practice (Pfau, 1977). The instructional behavior is context-dependent. The instructional context at that time was to take steps for investigating and exploring scientific and new methods and applying them systematically (Ministry of Education [MOE], 1971). Similarly, the official curriculum did not mention the instructional activities explicitly to enact and did not provision these activities as a part of practical assessment criteria (CDC, 1981). In Beeby's postulation, it was the formalistic stage of the schools (Beeby, 1966; Guthrie, 2018). In the current research, after forty years, it is found that the schools have library rooms, but they have not been connected with the purpose of instructional activities though the educational plan and the commission explicitly intend to establish school libraries for all secondary schools (MOE, 1971) and to connect libraries through daily routine allocating one period for each week (HLNEC, 2019). However, the national education policy (MOEST, 2019) which is expected to carry on the essence of the national education commissions, declined to state that activity precisely. Nonetheless, the commission mentions that the school library in educational institutions, from basic to tertiary level, would be developed, managed, and run with sufficient reference books. Inconsistent with the policies, the written curriculum and teacher guide have not mentioned library activity, and neither science

nor social studies teachers are with library-related PCK. This inconsistent interaction in the policy dynamics makes no influence on teachers' instructional behavior.

Similarly, the role of the micro-level school system requires establishing an interactive bridge between the macro instructional system and the library using instructional behavior. To this end, policy, plan, and schedule are not found being developed at the local level.

Similarly, another null instructional behavior is related to field trips and classroom reporting. This activity is found not in practice in the classroom though there are provisions in the official planned curriculum and teacher's guide. The field trip is one of the main instructional activities to be enacted by subject teachers of both social studies and science subject curricula (CDC, 2014, 2020). The teacher guide (CDC, 2017b) writes precisely that the students would be involved in a minimum of one field study assignment for each unit; and the report of which has been regarded as an aspect of practical assessment criteria for the students. The monitoring system is not functioning to encourage to enactment of the field trip activities as intended by the curricular policy. The school calendar is developed allocating the field trip dates and students are taken to different places. Sometimes, it is for picnic trips but the students are not required to prepare and present the field report. In this way, it seems that the activities are not linked to the science and social studies curriculum intents. This reveals that there are lapses in the functional mechanism of the macro, exo-, meso- and microsystem of the instruction to orient student library use and field-trip reporting behaviors. There is no direct interaction among the systems. As a result, the instructional behavior envisioned in the planned curriculum is not reflected in the teachers' behavior, thereby, failing to transform the classroom instructional behavior.

Reversing instructional behavior. In terms of the occurring time of the behavior categories, the structured laboratory work, and teacher demonstration activities in science and the student speaking in social studies likely decreased, but not at a significant level. However, teacher questioning in the classroom in both subjects decreased significantly. This informs (us) about the rejection of the notion of linear change intended by the pedagogical policy and discourse of instructional transformation.

Interacting dynamics of the structured laboratory work. The structured laboratory activity for science teaching is a laboratory-related practical activity provisioned as an alternative to unstructured laboratory work. In a structured laboratory category, students have little freedom for investigation or expression (Caldwell, 1971; Pfau, 1977). In this category of instructional behavior, a teacher demonstrates laboratory activities in a classroom rather than a laboratory room. Such “demonstration in teaching science is a less expensive or a safer way of providing students with experiences of laboratory experimental work” (Treagust & Tsui, 2014, p. 303). This type of laboratory work is also known as demonstration-laboratory activity. It allows the students to make observations of demonstrated activities rather than having hands-on experience in a laboratory (McKee et al., 2007). This behavior category is found in practice though it is rare.

In Nepal’s classroom context, the studies show that research on the instructional behavior category in science teachers’ classrooms was initiated since the NESP period. While comparing the research finding of 1974 with the present research finding, the practice of this activity category in the classroom has declined from .7% to .07% in terms of the instructional time employed by teachers. The finding shows that the laboratory work (structured) behavior or demonstrating lab activities has not

increased, rather it may have declined slightly over time from the NESP period to the present classroom practice despite the emphasis on it in the instructional policies. On the other hand, the time spent by the teachers on the laboratory activities is too low in comparison to the curricular intent, at least one structured (closed) or demonstration-laboratory activity in a unit is intended. Despite the activities of demonstration-laboratory to be performed in the classroom being explicitly and precisely prescribed in science curricula (CDC, 2014, 2020) and teacher's guide (CDC, 2017a), teachers are distant from the instructional prescription given in the teacher's teaching guide. This absence of an interface between the teacher's behavior and the curricular system is reflected in classroom practice. Many other dynamics are present weakening the demonstration-laboratory behavior rather than supporting the behavior. As perceived by teachers, there is devaluation of the teaching profession in society, content focus disposition of science teachers, lack of training to intervene the spontaneous pedagogical behavior, lapses in the instructional monitoring system and feedback, and insufficient demonstration-laboratory materials with the behavior declination. Moreover, some science teachers, whose higher education background is from general science rather than science education, seem to suffer psychologically as they have a feeling of a deflected career, as school teachers. This sense of lacking a sophisticated job implicitly reduces the teacher's enthusiasm. This depicts that the deteriorating interaction of the instructional systems ecology exerts minimal impact on the teacher's classroom behavior.

Interacting dynamics of the teacher demonstration behavior in science.

Teacher demonstration consists of presenting material by film, filmstrip, record, TV, radio, and activity demonstration which comes under teacher-centered teaching (Caldwell, 1971; Pfau, 1977). This traditional mode of demonstration is being

integrated with advanced technological ICT devices. Still, it is teacher-centered instruction. However, it is important for developing students' cognitive activity through perception and thinking, making their learning permanent, motivating them to active participation, and simplifying complex concepts. The research results of Pfau (1977) and this study indicate the practice of teacher demonstration is very rare in classroom instruction. The comparison of the teacher's demonstration instructional behavior in 1974 and 2022 shows a decrease from 5.5% to .91% of time devotion in the classroom. This slight decline in the teacher's demonstration of instructional behavior in the Grade 9 science classroom indicates that there has not been a linear progressive change across time.

Teacher education programs and courses matter. The teaching method course for B. Ed. intends to equip science teachers with knowledge and skills of demonstration with multimedia (FoE, 2015). In terms of teacher demonstration using multimedia devices, the relationship between the school science curriculum and the teacher's guide is inconsistent with the teacher development course of the university. The instructional guidelines about the use of multimedia for demonstration are inexplicit in the school science curriculum and teacher's guide. However, the TG states the teacher's hands-on activities clearly and precisely to be carried out for each lesson (CDC, 2017a). Despite this, the teachers are not informed about the intended activities given in the TG. Other contextual dynamics perceived by teachers at the micro systemic level that hinder the use of multimedia are time limitation, insufficiency of devices, content knowledge-focus assessment system, and dominance of content mastery-based quality interpretation, student achievement-based teacher evaluation criteria, and achievement-focused expectation of the bureaucracy, parents, and students. This inconsistency resulted from a non-linear relationship between the

macro assumption and the particular action incompatibly exists in the linear system of the intellectual assumption reflected in the instructional documents. In this whole revealing context, the teacher's instructional behavior evolves through the numerous intersections of technical rationality (Schon, 2016) or systemic order and uncertainty in the background of the complex dynamic systems reality. In this context, the teacher's decisional capital is crucial in managing complexity (Hargreaves & Fullan, 2015) which calls for responsive behavior adapting one's expertise and learned skills according to the complex classroom context.

Interacting dynamics of the student speaking behavior in social studies.

Student speaking behavior in this research covers the students' activities including expressing views, reading notes aloud, telling stories, describing personal experiences, asking questions, answering a question, or volunteering information in the process of classroom instruction (Caldwell, 1971; Pfau, 1977). This is represented by student talk behavior which involves responding to the teacher and initiating a talk (Flanders, 1974). This behavior category belongs to student-initiated instruction. The duration of the time in the percentage of the student speaking in a classroom informs the degree of opportunity to be engaged in verbal communication, interaction, and discourse. Such talk may take place between student-teacher or student-student in a large group, small group, or one-on-one in a classroom social context (Imbertson, 2017). This encourages the students to process text and ideas for deeper levels of understanding, which improves comprehension, critical thinking, and overall achievement (Piazza et al., 2015). Realizing this, the social studies curriculum suggests a satellite method (CDC, 2014). Similarly, TG prescribes plenty of instructional strategies like Think-Pair-Share, Jigsaw, small group discussion, numerous ideas, and experience-sharing segments (CDC, 2017b) to encourage

students to talk. Such intended teaching, learning, and experiencing opportunities for each student to develop a deep understanding and higher-order thinking ability (Crawford et al., 2005) which is also conceived as critical thinking ability (Brookhart, 2010) inheriting the student's creativity (Singh, 2015). Despite the intent of the existing policies and guidelines, student speaking behavior in social studies classrooms appears to be slightly declining. In 1974, it was 6.6% (Pfau, 1977). The present study, in the year 2022, shows that it is 6.01%. This informs that the student speaking behavior occurring time is about the same or may have declined, but has not increased, in the classroom compared to the past classroom behavior in this subject. As perceived by the teachers, on the one hand, the students hesitate to ask a question or initiate a conversation to share their ideas; and on the other hand, they do not study, thereby have no questions to ask and share ideas. It implies there is a non-linear influence on and changes in the behavior. Similarly, the time frame and classroom seating pattern perceived by the teachers indicate that they are likely not in support of enacting Jigsaw-like strategies in the classroom. On the other hand, the teachers' need-based TPD training curriculum indicates to focus on content knowledge rather than the pedagogical competency of the teachers (NCED, 2017a). Likewise, although the policy orientation of the SSDP is to promote classroom behavior with interactive pedagogies for active learning (MOE, 2016), the students talking time in the classroom may have decreased. Furthermore, the school-situated dynamics which were perceived to play a role in reducing the student speaking behavior in social studies, are the school systems that have promoted a culture of 'pin-drop silence'; and the classrooms, in which the teachers adopt a strict and authoritative style, keep spontaneity on the content delivery imposing own content knowledge, and teach in English medium. On the other hand, students with a lack of content information and

confidence to speak in a formal setting reduce the student talking behavior. This informs that the proximal dynamics strongly influence the classroom behavior which makes the instructional activity adapt and evolve through the interaction with a complex and dynamic systems context.

Interacting dynamics of the teacher questioning behavior. Theoretically, teacher questioning behavior is anticipated throughout the lesson phases- beginning knowledge building, and lesson-end (Crawford et al., 2005; Singh, 2014). Singh (2014) further states that the teacher asks a question with different purposes to promote active learning, arouse students' interest, engage students in deep thinking, learn from each other, and identify the difficulties of the students if any. The curricular policy informs that teacher-questioning behavior helps students develop a habit of answering questions quickly and briefly and makes them engage in thinking of answers to the questions and be alert (CDC, 2014). Questioning behavior in this research concentrates on and around the students' content knowledge learning. Classroom instructional transformation expects questioning behavior time to increase in the classroom over time of the school system. Unlike such pedagogical transformation discourse, the research result shows that the behavior has decreased over time since the later year of the NESP to this study. That is, in the year 1974, questioning behavior in the teachers was 7.4% in science and 7.0% in social studies classrooms (Pfau, 1977), but this study in 2022 finds 3.20% in science and 2.72% in social studies. This decreased difference is statistically significant. This indicates that teacher questioning behavior in the classroom decreased, rather than increased. This informs there is no linear change as intended by the instructional policy, teacher education program, and pedagogical discourse. The pedagogical discourses focus on classroom interaction and discourse, critical thinking pedagogy, and constructivist

pedagogy for higher-order cognitive learning. For the classroom practice of these paradigms, the teachers need to behaviorally externalize “how to teach is more important than the what to teach” (Singh, 2014, p. 6). The teacher questioning behavior is at the center of the knowledge-building paradigm by stimulating the students' cognition and classroom environment. Despite the paradigms, the teachers concentration on the process of knowledge banking relying on the textbook information (Freire, 1993), rather the process of knowledge building (Crawford et al., 2005; Singh, 2014) has led to the decline of teacher questioning in terms of time occupation.

In complex education systems, a huge input can sometimes result in very little or no impact (Dörnyei, 2014) because systems self-generate complex dynamics over and over and over again (Fullan, 2005). Teachers can perceive and react to the complex systems caused by the various dynamics. One among them is student characteristics, in that “students are coming to school neglected, abused, hungry, and ill-prepared to learn and work productively” (Larrivee, 2000, p. 293), which becomes a frequent complaint of the teachers in the community school system. The problem is that teachers cannot alter such a situation, rather they should produce adaptive behavior to respond to the evolving system. As the teachers reflect on the context causing the declination, students are so passive that teachers do not get responses from their students while they ask questions. This situation leads them to decide not to waste the class time by asking a question, though there is an instructional prescription in teacher’s guides to ask questions as an initial activity for brainstorming/drawing attention, as on progress activity for feedback and learning enhancement, and as a lesson-end activity for learning assessment (CDC, 2017a, 2017b). Their instructional behavior shrinks to lecturing and explaining the content information, nonetheless

becoming critical reflective practitioners bearing a challenging journey. Hence, the teacher's questioning behavior emerges as complex and adaptive behavior in the complex dynamic system where the teacher cannot enjoy a determinant and absolute agency in a classroom even if they have knowledge and skill of questioning.

Constant instructional behavior. Some instructional behaviors are nearly static in terms of time occupation in classroom instruction. The instructional categories that are nearly constant are lecturing in science and social studies, teacher demonstration, audio-visual and ICT in social studies subjects, and student speaking in science.

Interacting dynamics of the lecturing behavior. Lecturing, in this study, represents the teacher's verbal instructional behavior which involves reading the text, expressing his/her views, giving directions, asking for an assignment, or writing on a board. As corresponding behaviors, the students passively receive the information or directions from the teacher or textbook, read the text aloud or silently, write notes, and lull during a lecture (Caldwell, 1971; Pfau, 1977). It is teacher-initiated behavior. This instructional behavior turns the students into passive listeners (Hussain et al., 2011) rather than making them active participants and knowledge constructors. Caldwell (1971) argues that when teachers lecture or give directions students are only required to listen and rarely have an opportunity to interact with information at the higher levels. Hence, the lecturing activity cannot support the student's cognitive engagement. Lecturing behavior supports only the low-level cognitive ability of the students.

In the study conducted in Nepal in 1974, the lecturing behavior of the teachers was 68.3% of classroom teaching time in science and 81.3% in social studies (Pfau, 1977). To change such practices, the science teacher education program, instructional

policy, and curricular plan have been developed. Likewise, the structure of the official or planned curriculum was reformed by including the component 'how to teach' in addition to the components of 'why to teach' and 'what to teach' (CDC, 1998). Towards, many educational efforts have been made through educational policy, programs, plans, and projects to transform classroom instruction by reducing the lecturing behavior.

In the background of secondary science education, the empirical and policy literature reveals many efforts being made to transform secondary school science education and its classroom practice. Secondary Science Education Project (1984-1991), a landmarking initiative, was conducted with the objective of a holistic change in curriculum, teacher training, physical facility, and planning and management. However, a study showed a gap between the intended and implemented curriculum and the poor applicability of the new teaching techniques in the real classroom in its results (Asian Development Bank, 1998). I, therefore, argue that the new teaching techniques tested through such linear, control, and technical rational processes of the project interventions are hardly expected of their absolute functional strength in the natural complex dynamic systemic setting of the school classroom where the teacher is a professional human actor.

The teacher is a key actor in the classroom transformation for quality education. Teachers' commitment is necessary to achieve educational reform successfully (Day et al., 2007). A fundamental aspect of the teacher's commitment is human capital which is about having and developing the requisite knowledge and skills (Hargreaves & Fullan, 2015). To respond to this human capital needs, the NCED developed a competency-based teacher training curriculum in line with the three broader aims of developing secondary teachers with additional content

knowledge, pedagogical skills, and attitudinal changes (NCED, 2004a, 2004b). The need-based teacher professional development training approach has been introduced to promote professional competency that could be behaviorally observed and improve students' achievement through an effective classroom teaching-learning process (NCED, 2015). It seems that this overarching policy initiative is hardly perceived by the classroom actors in their everyday instructional behavior. This classroom research shows that the lecturing behavior of the present teachers in science and social studies are respectively 68.6% and 75.42% of the classroom instructional time. This suggests nominal change occurred in the subjects. However, the results of the one-sample t-test in science and social studies are respectively $p=.94 > .05$ and $p=.11 > .05$, which indicates no statistically significant change in the lecturing behavior of teachers in the past and the present. The formal policy and program dynamics to reduce lecturing behavior are found weaker than the dynamics supporting to prevail.

The teacher leads to a complex life interacting with a wide range of contexts. The things he/she perceives in the everyday professional and beyond the professional life shape his/her behavior (Pfau, 2017). In the stream of life, the teacher's perceived informal attributes unintendedly interact with the formal behavior. Such implicit and unavoidable dynamics such as teachers being skeptical about the newer techniques/methods and inability to stop the old teaching habits easily (CERID, 2003) support to keep on the lecturing behavior. Likewise, classroom behavior is also influenced by the "I" or self as a knower (Wagner, 1983). On the other hand, the policy hints at the improvement of student achievement in terms of content knowledge mastery rather than classroom activities. Similarly, the curriculum allocates seventy-five marks for theoretical written exams (CDC, 2014) for which students are required to have a deep and wide range of content knowledge. In

conclusion, despite the various factors that influence the teacher's instructional behavior, teachers tend to maintain the usual lecturing behavior of delivering and explaining the content knowledge and instructing bettering the students' achievement which is also supported by the academic preference, assessment policies, school system, classroom context, and parents' and students' aspiration.

Interacting dynamics of the teacher demonstration, audio-visual, and ICT in social studies. This behavior category covers the use of instructional aids, audio-visual devices, and other media like television, films, phonograph records, and tape recordings developed along with the advancement of technology which provide teachers with efficient and effective ways to present content information (Caldwell, 1971; Pfau, 1977). However, the time occupation of teachers demonstrated behavior in social studies in 1974 was .8% (Pfau, 1977). Despite the intent to promote teacher demonstration behavior with audio-visual and ICT use in the instructional policy and plan, the current study finding shows only .73% of the classroom teaching time is spent on it. Although the TG, a manual of pedagogical content strategies for the teachers' classroom activities, suggests video clips, video, multimedia, projector, PowerPoint slides, the internet, globe, google maps, maps, Atlas, cartoons, real objects, and many more instructional aids and materials for each lesson (CDC, 2017b), the teachers' demonstration behavior was minimal in the past and the situation has remained nearly the same in the present. This is due to the lack of interface between social studies teachers and the TG guidelines prepared by the authority. So, the teachers do not have information about the pedagogical content strategies contained in the TG. Likewise, the teachers perceive that the school's physical infrastructure, technological facility, financial condition, and teachers' technological know-how are likely not to support the use of technological devices

particularly in social studies classrooms. Despite this, teachers are enthusiastic to learn and adapt new technology in their classrooms. However, the teachers who are at the stages of career stability and wind-down (Burke, 1987; Maskit, 2011) perceived that the classroom would be technologically transformed by the teachers who are scaling up their career path at the “competency building and enthusiasm and growth” (Burke, 1987, pp. 14-15) stages. For them, they are the young generation. From this, it can be said that the teacher's demonstration and audio-visual and ICT-using behavior are shaped by the availability of GT, technological devices, and infrastructure, as well as the stage of the teacher's career scaling up.

Interacting dynamics of the student speaking behavior in science. Student speaking behavior is also described as a student talking. It indicates the instructional situation in the classroom when students are making verbal contributions, expressing views, telling stories, describing personal experiences, asking questions, or answering questions (Caldwell, 1971; Pfau, 1977). Among the activities, student talking is considered a key activity for students' effective learning in science classrooms (Tanner, 2009). An opportunity like open-ended discussions in a classroom (Miri et al., 2007) for student speaking fosters the ability of students' higher-order thinking (Crawford et al., 2005). Here, critical thinking is an operative example of higher-order thinking (Miri et al., 2007) which involves scientific knowledge construction in the classroom (Driver et al., 1994). The instructional policies and plans are expected to change instructional behavior as per theoretical assumptions.

The educational policies and plans are not precise and explicit regarding the student talking or speaking activity. However, the science curriculum for Grade 9 states the classroom instructional methods like discussion and satellite methods and TG contains small-group discussion and Think-Pair-Share and Mix-Freeze-Pair

techniques. On the other hand, the teachers' need-based TPD curriculum (CDC, 2017b) for science stresses teachers' autonomy and empowerment for identifying and adopting content-relevant instructional methods and modifying them to make them applicable and practicable along with the changing times. This encourages the teacher to use professional capital and agency to make the instructional decision to acknowledge the students' autonomous expression in the classroom. Contrary to this, the research findings show that student talking behavior is likely to remain constant in terms of time occupation in the classroom. In research conducted in 1974, the student speaking time was 6.4% of the class time (Pfau, 1977). Student talking behavior in the present classroom is 6.8%. This shows no dynamism in the classroom in terms of students speaking time. This shows that the pedagogical discourse of constructivism, a transformative agency, policy intents, and training interventions have a very nominal impact on student speaking behavior. However, the finding reveals that if teachers are convinced with training or orientation like 'go to the level of students, accept the student's storm and stress psychological characteristics, and behave friendly or teachers are in the stage of professional winding-down; the students start to speak breaking the culture of silence of the traditional classroom (Shor & Freire, 1987). Furthermore, insufficient policy specificity, explicitly, and obligatory for student speaking behavior; students' hesitation in speaking; and teacher's content delivering instruction play hindering roles in the student speaking behavior. The influence of the instructional dynamics is close to equilibrium.

Transforming instructional behavior. Transformation in this study means changing the instructional behavior from teacher-centered to student-centered in terms of class time occupation. While comparing the research findings of 1974 and the present in 2022, among the behavior categories prevailing in the classroom, the group

work/project work and student demonstration or presentation in both subjects and individual practical activities in social studies seem to have increased a little over time since the NESP. In these cases, the thrust of the transformative dynamics seems more influential upon the particular behaviors towards progressive dynamism.

Interacting dynamics of the group work or project work. This instructional behavior is to represent the hands-on activity carried out by one or more groups of students on a given project work during the class period (Caldwell, 1971; Pfau, 1977). Project-based learning grounded in the progressive education movement for student-centered and experiential learning (MacMath et al., 2017) is expected to develop competencies, including problem-solving, responsibility-taking, working with others, working independently, critical thinking, confidence building, communicating well with a variety of people (Larmer et al., 2015). The project-based learning opportunity in the science classroom makes the students feel work like scientists (Krauss & Boss, 2013) which reduces the monotonous teacher lecturing.

Instructional policy and systems have a crucial role in the translation of the project-based learning assumption into reality. The teachers' pedagogical content knowledge on student project work in science teaching and social studies teaching courses of higher education for prospective secondary teachers is anticipated to be enacted in the classroom. National education policy (MOEST, 2019) prioritizes the project work in instructional plan, program, and practice not just in the form of instructional activity, but also as a basis for learning assessment. On the same line, the science curriculum for grade 9 (CDC, 2014) also emphasizes individual or group project work for students to investigate scientific hypotheses, facts, and theories; prepare scientific specimens; and conduct environmental-related research. Because of the financially deprived condition of Nepal's school classrooms teachers tend to adapt

instructional behavior by assigning project work-like tasks to the students in small groups to prepare informative charts collectively and cooperatively for practical assessment rather than the expensive laboratory work to fulfill the criteria provisioned in the science curriculum. Similarly, the social studies curriculum (CDC, 2014) tends to enact a "learning by doing" approach, further making teachers informed that children gain more confidence when they learn by doing.

It is found that project work occurred frequently in teachers' and students' talks. There are other contributing dynamics as well like students' excitement to work in groups and collect information about historical and cultural heritages with no cost to carry out the project work. Consequently, the research results indicate a change in group work or project work in a classroom. In the year 1974, it was .00% practice in both science and social studies classrooms. In the study conducted in the year 2022, the project work occupied 1.03% and 1.30% of classroom teaching time in science and social studies respectively. National Assessment of Student Achievement (NASA), Nepal, found that such project activity has a positive impact on student achievement (Education Review Office [ERO], 2020). However, the project work seems to be adopted only for assessment purposes rather than as usual instructional behavior. This transformation, though it is too small in the degree, has been possible through supportive dynamics of the macro and micro instructional systems.

Interacting dynamics of student demonstration or presentation behavior.

Conceptually, student demonstration or presentation behavior represents activity-based instruction. In this activity, students individually or in a group are encouraged to demonstrate or present their project work completed in the classroom or out of the classroom context (Caldwell, 1971; Pfau, 1977). Hence, it is a subsequent behavior of the activities discussed in the previous section. The demonstration or presentation is

an extended intellectual skill relying on higher-order thinking and competencies. The students studying at the secondary level are expected to develop such additional competencies along with content-specific academic knowledge, which is for the readiness for college study (Conley, 2008). These competencies involved in project work presentation are critical-thinking skills, problem-solving skills, openness to utilizing critical feedback, clear and convincing written and oral expression, ability to weigh sources for importance and credibility, ability to draw inferences and reach conclusions independently, and time management skills (Conley, 2008; Krauss & Boss, 2013). This hints at the requirement of instructional policies that direct a course of action.

For the transformation of classroom instructional behavior, policies, and policies in practice matter. The national education policy (MOEST, 2019), in the context of Nepal, intends to institutionalize the student performance-based assessment technique and measures like a presentation of project work report based on the classroom, the student's community, or family. The NCF also intends to carry on the same line of assessment notion to reduce the test tradition and to promote alternative assessment measures like classroom work, group work, etc. Furthermore, though science and social studies curricula emphasize project works, the presentation of the project report in the classroom as a learning process seems not to be explicitly provisioned. However, it has been provisioned as an assessment criterion for the final assessment of students' practical works.

The classroom research findings indicate progress in the behavior of student demonstration or presentation. The study results of Pfau (1977) show that it was .00% time occupation, not in existence or practice of the student demonstration and presentation in both subjects' classroom teaching by the end of the NESP, i.e. by

1974. In the present study conducted in 2022, it is 2.73% and .90% of classroom teaching time in science and social studies respectively. As the teachers shared their perception, the practical assessment was not a provision in the past, it is a new practice in terms of the assessment process. They give a subject-related topic to prepare a report and submit to the subject teacher. Teachers facilitate them in writing a report based on the pedagogical knowledge and skills learned from the 2-Year B. Ed. and One-Year B. Ed. university programs. As informed by the teachers working in this policy context, they are giving project work instead of laboratory work for the practical assessment provision mentioned in the curriculum. This shows that the teacher adapts instructional behavior pragmatically responding to the parameter of the available time for instruction, student interest, evaluation criteria, and local school system. The teachers are adapting instructional behavior in between the order of the linear system and the chaos of subjective dispositions.

Interacting dynamics of individual practical activities in social studies.

Assignment of practical or non-practical works to individual students in the classroom is theoretically aligned with individual differences and learning styles. This instructional approach responds to the diversity in the classroom which signifies a complex context of the classroom that resists the teacher-centered traditional lecturing behavior. The individual activities in the classroom are firmly grounded in the cognitive construction theory (Piaget, 1964), but find only limited space in the co-construction theory (Vygotsky, 1978) of social studies in the classroom. In this regard, research findings on individual work inform that it can be equally engaging as group work and more effective than traditional lecturing (Shernoff et al., 2014). The individual practical assignment is an activity-based instruction that encourages the students to engage in the hands-on learning activity. In social studies, some lessons

intend to develop students' creative and constructive skills, based on students' idiosyncratic skills, for which teachers require diverse instructional facilitation behavior to respond to multiple intelligences and interests (CDC, 2014). The subject curriculum further intends to enact the learning by doing practical activities. Intersecting the policy and practice, in social studies classrooms, it is found that teachers assigned students curriculum-related activities, like sketching timelines, calculating the time difference of the countries, etc. in the Geography portion. The occurrence time of individual practical activities along with the group work in the classroom in social studies has increased in comparison to the past classroom. As the result of systematic classroom observation research conducted in 1974, it was .00% practice (Pfau, 1977). After decades of efforts made at the policy level and pedagogical transformation discourse, the present research conducted by this researcher shows a bit of change, that is, the time occupation of the individual activities at the present classroom is .23% of the classroom teaching time. It seems that it is a small impact of the great effort in terms of academic, professional, and policy input.

Non-oriented instructional behavior: Notebook work and its interacting dynamics. Notebook work also termed workbook work, or exercise book work is practiced in the classroom. More precisely, this work encompasses those activities that take place in the classroom engaging the students with workbooks on doing classwork, completing homework, doing question answers from a textbook, and engaging in an art type of work (Caldwell, 1971; Pfau, 1977) and the teacher correcting the workbooks or notebooks. This work is for writing tasks that enhance the students' content knowledge organization and academic content language learning. Hence, writing about content is equally important as talking about the

content (Rivard & Straw, 2000). Notebook work as an "act of writing requires thinking, offers opportunities for reflection on content, promotes the attainment of personal meaning, and furthers the development of processing skills, such as organizing ideas and reasoning" (Hohenshell & Hand, 2006, p. 261). So, it involves higher-order academic thinking.

In policy response to this literature positioning, the National Education Commission, Nepal, suggested, for the first time, homework, book review, and class work, apart from written examination, as informal measures of assessment (NEC,1992). Moreover, the national education policy (MOEST,2019) intends to develop parameters and procedures for students' homework management. Likewise, the NCF explicitly states that classwork and homework would be included as tools for formative student assessment purposes. Although notebook work is not an explicitly intended activity in the both subject curriculums and TGs of grade 9, classroom research shows it was and is being practiced in classroom instruction. In the research conducted in 1974., it was 4.4% and .8% of teaching time occupation in science and social studies classrooms respectively (Pfau, 1977). Decades later, in the year 2022, the present research shows 11.02% and 7.49% of time occupation in the respective subjects. In the case of science, the teacher's instructional behavior in the past and the present, in terms of notebook work in the classroom, is a significant difference that is $p=.02 < .05$. Likewise, it has increased in social studies as well, with a remarkable difference. On the other hand, NASA also found that students' engagement in classwork and homework and teachers' feedback on them have a positive impact on student's academic achievement (ERO, 2020). It reports, that along with the increased classwork and homework activities in the classroom, the students' learning outputs have also improved.

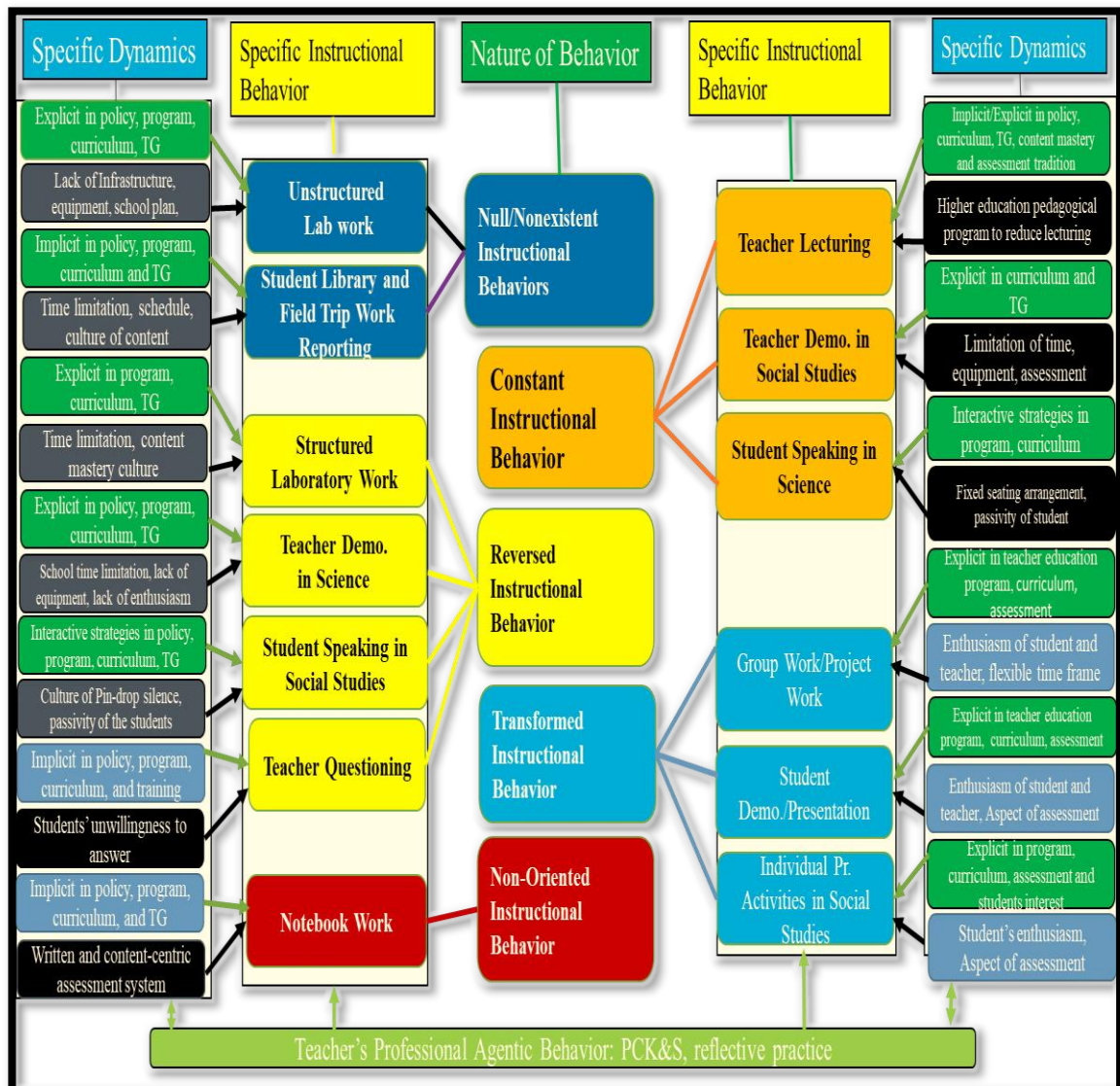
Regardless of neutral policy dynamics, the research result indicates that the time occupation on notebook work or workbook work activity has increased. This tells that the workbook work classroom behavior is evolving through a long way of conscious and non-conscious co-practice of teachers and students working under the local school system. It seems a notebook culture evolved through a long practice. In the dominant context of the achievement score-focused linear system conceived as an instructional quality measurement, as the teachers shared, they urge the students to make a notebook and get it corrected compulsorily from the subject teacher. It seems that the teachers find it the best technical instrument to produce instructional output as desired by parents and the linear school system. In this output-driven behavior, the students learn by heart the already checked or corrected answers to the set of questions in their copy for examination. This activates the lower cognitive process rather than the higher-order process. So, even if it produces high student achievement, the process does not seem to transform teachers' instructional behavior as assumed in the child-centered pedagogical discourse.

To sum up, the interface and interplay of the classroom dynamism and dynamics are reflected in the classroom instructional behavior categories. The continuum of classroom dynamism is the historicity intertwined with the education system situated in the complex school system and its classroom context. The changing status of the instructional behaviors embedded in classroom chronosystemic context interface complex dynamics. The classroom instructional behaviors are the causal consequences of the complex systemic dynamics. The complex dynamics influence the instructional behaviors nonlinearly that make directional change difficult to predict exactly. Hence, the causal consequences in this complex context are likely

unpredictable. Figure 5 depicts the interacting dynamics intersecting with instructional behavior categories.

Figure 5

Interacting Dynamics Associated with Instructional Behavior Dynamism



The study found nonlinear transformation of the instructional behaviors which possess unpredictable direction of change. They are characterized as null, constant, reversed, transformed, and non-oriented clusters of behaviors. Each of the behaviors intersects and interacts with favorable and unfavorable dynamics of the complex chrono-educational system situated in a classroom context.

Chapter Seven

Conclusions, Limitations, and Implications

This concludes the study with major findings, conclusions, limitations, and implications. Epistemologically, this chapter informs the members of the scholarly community, practicing teacher educators, evaluators, and policymakers about the existing classroom practices. It provides bases to set further courses of intellectual work in the field of classroom instructional behavior. This chapter, a meaningfully organized body of knowledge based on the systematic analysis of findings on instructional behavior and its dynamics, provides a basis to set further courses of scientific and academic works in the field of instructional behavior study. This chapter reveals the scholarship (Clare, 2004) of this research scholar. On this ground, this chapter deals with three sections. The first section presents the conclusions including major findings of this study. The second section deals with the limitations. The third section comes with the implications of this study.

Conclusions

The time occupation of the instructional activities enacted by the teacher or student measures the instructional status of a classroom and informs about the extent to which the teacher's or student's behavior dominance has prevailed and classroom transformation has occurred. In the forty-eight-year chronosystemic course of time, there has been a small, not substantial transformation in instructional behaviors in terms of time occupation by the activities. The small change, which is unexpected by the macro policy intents, indicates factors weakening behavioral transformation. The instructional behavior is intertwined with multiple and complex resisting and supporting dynamics which cause the instructional behavior to turn likely unpredictable, uncertain, and evolving

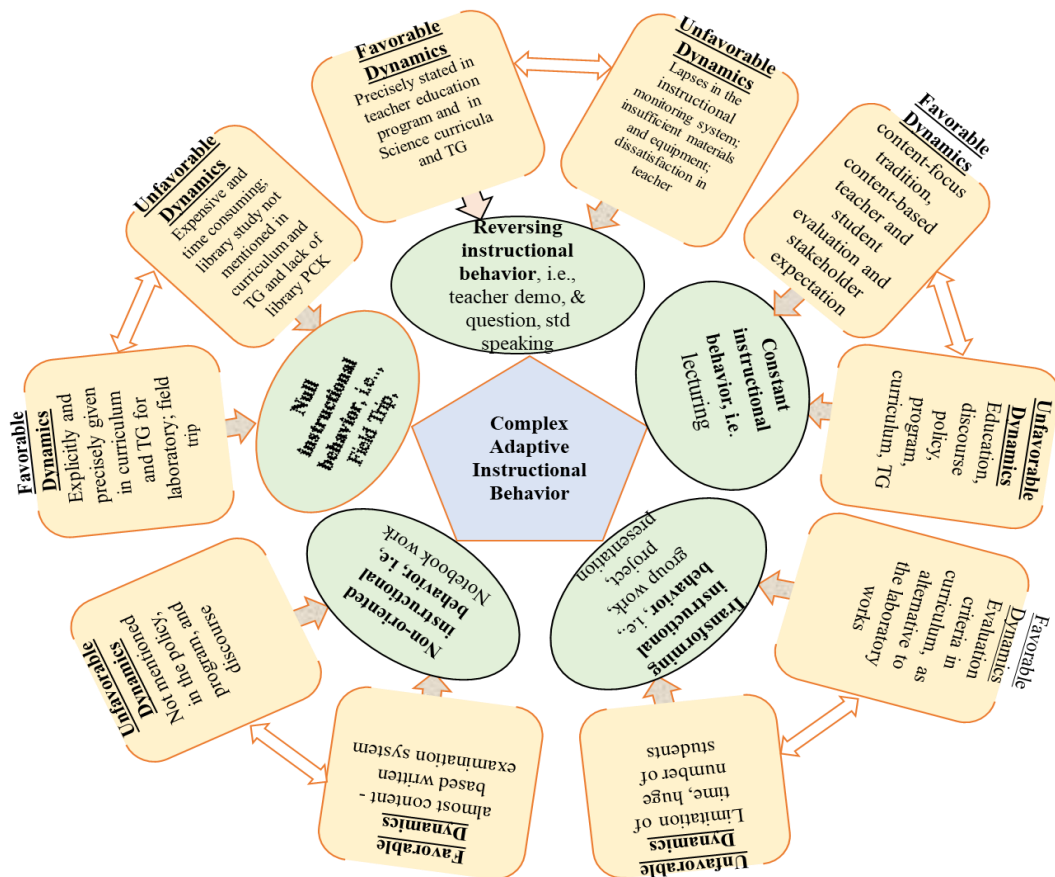
nature of change, despite the goal-focused policy effort. Unavoidable complex dynamic systems' context, the strange, reductive, linear, systematic, and macro policy, program, and intervention can orient instructional behavior thinly. The dynamics of instructional behavior are at the back end and beneath the iceberg tip rooted in the facts established by diverse disciplinary studies. In an apparent understanding, classroom instruction has been perennially dominated by teachers' instructional activities limiting the student learning activities despite the progressive intent of the instructional policies and pedagogical discourses.

The teacher talking or lecturing and notebook work categories, which are teacher-centered, have occupied almost all classroom time, promoting content-driven pedagogical activity. This instructional behavior, which has inconsistent interaction with transformative instructional policies and pedagogical discourses, promotes teacher-centered, content-focused, knowledge transmission, low cognitive engagement, and assessment-focused instructional activities in the classroom. The too-low percentage of the time occupation of the student speaking, group work/project work, or presentation categories indicates little or no time to practice deep learning activities such as classroom discussion, problem-solving, cooperative learning, reciprocal teaching, inquiry-based learning, and the Jigsaw method, though they have proved to have a high impact on student learning outcomes in the context of advanced countries (Hamilton & Hattie, 2022). Likewise, the development of twenty-first-century skills that belong to higher-order thinking skills like leadership, communication, critical thinking, creative thinking, and problem-solving skills, through the classroom is remote and impossible without the support and encouraging environment of the local microsystem situated in a school context.

Instructional behavior is a flexible endeavor that is an integral entity of the classroom process. It possesses the potential of adaptability to be integrated with contextual and complex systems in practice. The nature of instructional behavior postulated through this study is “Complex Adaptive Instructional Behavior”, a model visually shown in Figure 6, that describes, predicts, and explains a complex dynamic systems entity. This characterizes relational, interactive, adaptive, flexible, knowledge-based, and edge of order and chaos.

Figure 6

A Model of Complex Adaptive Instructional Behavior



The behavior is a complex process entity constantly interacting with the dynamics of the instructional system, which turns the classroom context into an evolving transformation process and reveals a mosaic of activities linked to assumed student learning. It opposes the traditional epistemological notion that characterizes

linear system coupling with technical rationality. Rather, it is pragmatically adapted and constantly evolving in the complex classroom context of micro-school systems.

Classroom dynamism is characterized as a slow-evolving transformation of instructional behavior in the complex interaction of the dynamic forces related to instructional systems. The national instructional policy, at the macro level, having interacted with global pedagogical issues, agenda, and knowledge intends a speedy transformation of the classroom pedagogy to influence classroom behavior which confronts the school system situated complexity. Although, it has been seven decades since progressive educational philosophy was integrated into Nepal's education system, such a progressive effort is still resisted by the publicly nurtured content-driven pedagogical school culture. Similarly, the scientific curriculum design and research and innovation on classroom pedagogy assumed by NESP (1971-1976) is also a historical effort to transform instructional activities. The classroom instructional behavior at that time was at Beeby's formalistic stage (Guthrie, 2018; Pfau, 1977) which is assumed to have transformed the transition stage to the meaning stage (Beeby, 1980; Guthrie, 1980), espousing progressive techniques like child-centered, constructivist, meaning, participative, and active learning (Guthrie, 2021). Despite the progressive instructional policy discourse, the classroom observation research conducted in 2022, after decades later of Pfau's study in 1974, has evidenced that the instructional activity ratio of student activity to teacher activity in science has changed from .09 to .13 and in social studies from .08 to .11 only (ratio calculation based on Caldwell formula given in Appendix B) which is not a significant change. This informs that instructional behavior does not occur in the notion of technical rationality but rather seeks an adaptive process through reflection in action (Schon, 2016). The nominal or very slow pace of transformative dynamism or change in

instructional behavior is the consequence of complex interaction between macro and microsystems. Although pedagogical transformation discourse is at the center of the teacher education program, teacher development training policy, program, and curricula, the spirit of transformation has not been adequately enacted in practice. Hence, the changed pedagogical policy and discourse of classroom transformation, representing the intended instructional dynamics, confront and nonlinearly interact with the local school classroom system-situated dynamics.

The nature of the behavior categories occurring in the classroom is revealed as non-existent, reversing, constant, transforming, and non-oriented instructional behaviors. Each set of behaviors has a complex interaction with dynamic forces. In this way, the classroom behaviors are intertwined with the complex dynamics interacting among themselves and with the classroom behavior constantly which results in a complex adaptive, flexible, uncertain, self-organizing, and evolving characterized instructional behavior. As a result, despite the speedy transformation policy and discourse intents on the classroom practice, it is too slow to shift the classroom dynamism from the teaching paradigm to the learning paradigm in practice. An absolute and discrete transformation from teacher activity to student activity, as either-or, is impossible in the complex interaction setting. Rather it is a process of adapting and evolving where scientific epistemology can be taught both with formalistic pedagogy for transmitting knowledge and progressive pedagogy for constructing in a classroom (Guthrie, 2018). Hence, this implies that instructional behavior change in a complex context is a very slow, tense, and effort-requiring process. The instructional behaviors or activities are evolving systemic entities through the complex dynamic instructional systems which signify particular meaning in terms of the student learning.

In a nutshell, the classroom behavior practice is intertwined with the intents, contents, and contexts of explicit and implicit systems coded or not by the existing policies and informed by pedagogical discourse consciousness in the periphery of technical rationality. The practice spreads diversely in an array from student-centered activities, though it is a very small portion, to teacher-centered, in a very large portion, in the classroom. The practice context is complex and ignores the either-or positions or the linear and discrete change/transformation assumed as from the teacher-centered towards the student-centered. Although the theoretical positioning is acknowledged by the teachers through the pedagogical discourse, the classroom behavior is the process that pragmatizes the theories and policies derived from the text regardless of the pedagogical positioning and their learning preference. Hence, classroom behavior is a dynamic, complex, reflective, evolving, flexible, and adaptive process responding to the emerging complex system caused by the constant interaction of the systems throughout the supra-, macro, exo-, meso-, and micro levels. Moreover, classroom behavior is a core systemic entity that is inevitably attached to actors' systems of cognitive, affective, and behavioral processes; which are influenced by a range of factors including personal and professional experiences, school-specific conditions (leadership, cultures), broad cultural and policy contexts, psychological factors, classroom organization, teaching approaches used, and the characteristics and backgrounds of his/her pupils (Day et al., 2007). In this sense, teachers perceive the complex classroom systemic context, think critically, and behave adaptively to the classroom practice. So, the teacher's personal behavior system evolves through self-organization in the complex systems corresponding to the behavior of the students. The unavoidable interaction of the structured (order) and less structured (chaos) systems gives space to self-organizing behavior which is a complex

adaptive behavior (Brown & Eisenhardt, 1998; Fullan, 2005). In such a context, the behavior cannot be perfectly predicted as assumed by Beeby (1966) linearly, by a single theoretical positioning, by a linear system, by a technical rational policy, and so on. Rather, it seeks a ground of the pragmatic premise which aligns with Kumaravadivelu's post-method pedagogy focusing on 3Ps like particularity, practicality, and possibility parameters (Kumaravadivelu, 2001), utility and value of the activity in terms of official assessment criteria. Hence, the behavior is mostly influenced and determined by the dynamics of the school-classroom microsystem, rather than distant the meso-, exo-, and macro systems.

Limitations

For statistical analysis, a one-sample t-test was planned. However, the normality test results allow only teacher questioning and lecturing in science and social studies subjects; and student speaking and notebook in science for one-sample t-test. Other variables failed in the normality test. So, a comparative analysis of the past and present behavior differences has been performed based on the calculated mean percentages of the past and present classroom behavior.

The quantitative research findings concerning the behavior occurrence time have not valued the behavior that occurred in less than two seconds. These behaviors have been represented by the preferred or dominant behavior occurring within five seconds.

The research is based on an explanatory sequential mixed-method research design. In this design, relying on the methodological literature, qualitative data were based on only the extreme value cases for lecturing behavior (high and low), student speaking (low), and notebook work (high) selected. So, the research findings related

to the dynamics of classroom instructional behavior were drawn only from the cases related to lecturing, student speaking, and notebook work.

The research was conducted between and after the 1st and 2nd COVID-19 pandemic lockdown, considering the behavioral sensitivity. Realizing sensitivity and data validity, in such a situation, this researcher waited for a favorable time and assessed the normal life of the school classes closely. Due to the lockdowns, the data collection from physical classrooms could not take place as it was planned. So, the effect of COVID-19 on classroom activity was not calculated, since the teachers' usual classroom activities are considered naturally reoccurring phenomena until and unless changes in the context and system occur.

The previous research was based on the many districts of the then-central development region. This researcher thought that the instructional behavior being practiced under the same formal school system prevails in a similar manner in all school classrooms across the country from a technical rationalist or deductive view. So, the effect of geographical variation has been assumed constant due to the formal setting. So, the study sample was taken only from Bhaktapur through a random sampling strategy.

Although many research tools were planned to be used for the data collection, only two comprehensive data collection methods, i.e., Systematic Classroom Observation by using video recording and Narrative Interviews with four research participants were used. Though the actors at different systemic layers or aspects might have perceptions on instructional behavioral practice, this research is limited to the only two tools. This has given space to upcoming researcher in this field to work with extensive tools.

Implications

The implications of the study findings are presented under different headings.

Implication for pragmatic policy development. The study findings show that instructions in macro policies and plans are too distant from the teachers' instructional behavior. The systems-embedding context for instructional behavior is complex and is likely not being addressed by the macro linear policies. The discrepancy between policy text and classroom complex context is found to be a wide gap. This finding suggests generating instructional policies at the school level in the involvement of teachers and other school community members. In this line, this study suggests intervening the existing instructional practice with an alternative approach characterizing school-based comprehensive micro instructional policy development by utilizing the agency of the teachers and school community members, mobilizing the available school resources adequately, ascertaining the sustainability of the policy, explicitly measuring the transformation of the classroom instructional behavior, integrating policy and practice closely, and modeling a school system through a micro policy.

Implications for theoretical advancement. This study, at a general theoretical level, implies giving space for a paradigm shift from a linear systemic theoretical perspective to complex systems theory for a better, holistic, and proximal understanding of the context reality (ontology) comprising of unavoidable complex dynamics that influence behavior in a classroom, in the professional fields and in the fields beyond the professionals. Systems are unavoidable phenomena that interact with everyone's behavior, the systems and the human behavior constantly interact and produce dynamism.

This study acknowledges the adaptive and evolving behavioral epistemic practice aligned to complex dynamic systems in a classroom context as an alternative or competing lens to the notion of the traditional linear system.

This study implies researching classroom behavior from a complex dynamic theoretical perspective to respond to the pedagogical problems pragmatically.

Implications for theory building. The findings reported in the present study are the outcome of the processes of conceptualization (conceptual framework), operationalization (establishing research question, hypothesis, development of research design, conforming and developing quantitative and qualitative instrument), and confirmation (data quantitative and qualitative collection, analysis, interpretation, and presentation of findings) (Swanson & Chermack, 2013) of the classroom behavior or instructional behavior. These processes of theory-building validate as a complex systemic entity, that is a systems-embedded, knowledge-based, complex, evolving transformation, value-oriented, and directly interwoven into microsystems of school and classroom.

Implications for policy and practice. The study informs that an inconsistent interaction among the macro-, exo-, meso-, and microsystem causes a rare influence of the intents of the instructional policy dynamics on instructional behavior. This implies that an active role of actors of the meso- and exo-systems is expected to bridge the policy intents and classroom instructional behavior and narrow down a gap between macro (intent) and micro (practice) systems.

The instructional behavior is mostly influenced by the local microsystem which implies that the policymakers and planners are required to formulate instructional policy and plan at the school level with the participation of the head teachers and teachers.

The study found that micro dynamics are more influential than macro instructional policies and plan dynamics. This implies a focus on the formation of explicit micro-level or school-level policies and plans specifying instructional activities to enact as instructional behavior in each class and subject to promote student-centered activities that ensure the sustainable learning and complex learning of students.

The research findings show that only those intended activities are in the practice which are termed as part of student assessment. This suggests the policy formation should prefer diverse classroom instructional activities and provision to assess all activities as core criteria for teachers' professional development evaluation and student learning assessment.

The practiced instructional activities observed in this research are characterized by nonexistent, constant, transforming, and non-oriented categories of behaviors. This explicitly indicates the need for the penetration of pedagogical discourse and revisiting the existing instructional policies to reduce the distracting dynamics and promote the supporting dynamics for evolving transformation of the intended but non-existent instructional behavior like unstructured laboratory, field trip reporting, and library study; the reversing instructional behavior like teacher questioning, structured laboratory work (in science), teacher demonstration (in science), and student speaking (in social studies); the constant instructional behaviors like a teacher lecturing, teacher demonstration (in social studies), and student speaking (in science); the transforming instructional behaviors like, group work/project work, student demonstration or presentation, and individual practical activity; and the non-oriented instructional behaviors like notebook work.

The research shows that the ratios of student activities and teacher activities in the classroom are .13 and .11 in science and social studies respectively which were .09 and .08 in 1974 in the respective subjects. While comparing the classroom behavior that occurred in the two different years, the differences in the ratios of the classroom behaviors indicate some increase in student activity. This small degree of change in the decades-long time implies that the behavior in the complex systems does not take place in the form of a linear transformation, instead, it evolves through a complex interaction of the dynamics which is very slow in its pace.

Implication for further research. This study implies that the quantitative techniques of direct systematic classroom observation should be at the center of classroom teaching-learning behavior research, regardless of the wide use of classroom research that prioritizes teachers and students' opinions and responses.

This study has yielded the current status of instructional behavior or activity categories by using systematic classroom observation which is reliable, actual, quantifiable, and comparable data related to the time occupation of the student and teacher activity categories. This suggests a need for conducting further systematic classroom observation to measure the actual level of transformation, determine the extent of the changes in the activities, and identify patterns of interaction in the classroom.

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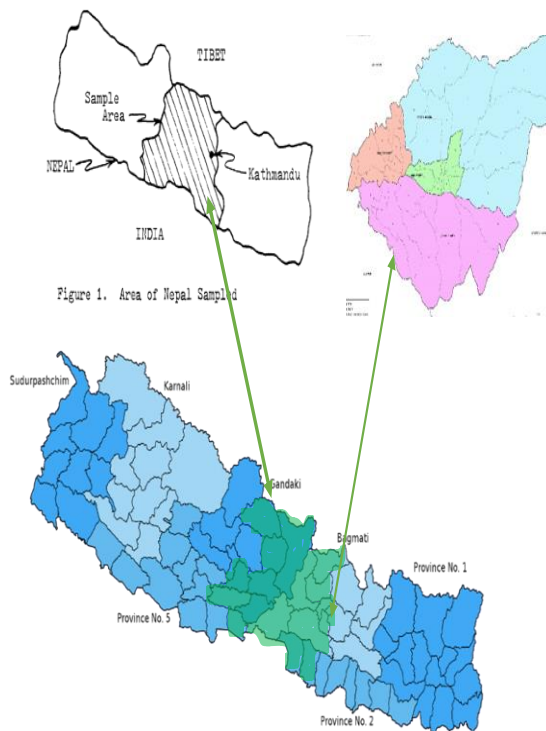
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Appendices

Appendix A: Geographical Delimitation of the Study

Geographical Delimitation of the Study (Bhaktapur)



Images adapted from Pfau (1977); Sagarikhatri (2020). CC-BY-SA-4.0, & NepalArchives.com (2021)

Appendix B: Video Recording and Coding Manual Using ACI

This researcher has developed to conduct classroom observation using video recording instead of live encoding. For the sake of valid and accurate data generation, a manual is desirable guideline. The classroom researcher gets a complete procedural knowledge for recording the target instructional behavior activities of the classroom and encoding them. Hence, this manual is developed for the purpose of the systematic direct classroom observation research using video recording device. The manual has been prepared by adapting the Activity Categories Instrument (ACI) for Science developed by Caldwell (1971) and for social studies by Pfau (1977). The ACI categories and their descriptions, coding format, ground rules, technical rules for coding, and ethics and confidentiality in classroom observation and video recording are the main aspects contained in the manual.

ACI for Science Classroom Observation Contextualized to Nepal

STUDENT-CENTERED ACTIVITIES	1. LABORATORY EXPERIENCES: OPEN-ENDED	Students are presented a problem to be solved by experimentation. The procedure may or may not be given. They are required to make observations and analyze or interpret their findings.
	2. LABORATORY EXPERIENCES: STRUCTURED	Students are presented a laboratory experiment with a structured procedure. They are not required to analyze or interpret their data. They are asked to make observations.
	3. GROUP/PROJECT WORKS	One or more groups of students are working on a science project during the class period. Some may work individually. (Not written projects.)
	4. STUDENT DEMONSTRATIONS, ORAL PRESENTATION	A student or group of students demonstrate a science experiment or project which they have prepared. (Oral report on science project would be included.)
	5. STUDENT LIBRARY RESEARCH, REPORTING, ETC.	(a) A student or group of students give an oral report they have prepared based on reference material. (b) The class works with reference materials for purposes of writing or making reports. (c) Field trips. (d) Internet search.

	6. STUDENT SPEAKING	The student contributes verbally by asking a question, answering a question or simply volunteering information. Student writing on the blackboard is also included.
	7. TEACHER QUESTIONING	Students are asked a question by the teacher. Silence following questions is also included.
TEACHER-CENTRED ACTIVITIES	8. NOTE BOOK WORK	Students work in class on workbooks, homework, questions from text, art type work, etc.
	9. TEACHER DEMONSTRATIONS AND AUDIO-VISUAL and ICT INSTRUMENTS USE	The teacher presents material by film, filmstrip, models, charts, textbook pictures, radio, demonstration, materials, computer, etc.
	10. LECTURE	The teacher reads aloud, expresses his views, gives directions, makes an assignment, asks rhetorical questions, or writes on the blackboard. Students are expected to listen. They may interrupt only when they do not understand. Student reading in the text is also included.
	10. 1. LECTURING	Same as "10" above excluding teacher dictating and student reading.
	10. 2. TEACHER DICTATING	Teacher dictates information to students which they write down.
	10.3. STUDENT READING	One or more students read from their textbook, blackboard, or other written materials.
	11. SILENCE OR GENERAL HAVOC	The class may be cleaning up, setting down or doing something. In general, this category should be used sparingly.

ACI for Social Studies Classroom Observation

STUDENT-CENTERED ACTIVITIES	1.	
	2. INDIVIDUAL PRACTICAL ACTIVITIES	A student works on social studies project in classroom individually.
	3. GROUP WORK OR PROJECTS	One or more groups of students are working on a social studies project during the class period. (Not written projects)
	4. STUDENT MEMO.AND ORAL PRESENTATION	A student or group of students demonstrate social studies group or project work which they have prepared. (Oral report on social studies project would be included.)
	5. STUDENT LIBRARY RESEARCH FIELD TRIPS	(a) A student or group of students give an oral report they have prepared based on reference material. (b) The class writing works with reference materials. (c) Internet search Students give oral report on the field trip events, experiences, and learnings in classroom.
	6. STUDENT SPEAKING	Student contributes verbally by asking a question, answering a question or simply volunteering information.
	7. TEACHER QUESTIONING	The students are asked a question by the teacher. Silence following questions is also included.
TEACHER-CENTRED ACTIVITIES	8. NOTEBOOK WORK	Students work in class on workbooks, homework, questions from text, art type work, or correction of notebooks by the teacher etc.
	9. TEACHER DEMO. USE OF AUDIO-VISUAL AND ICT INSTRUMENTS	The teacher presents material by film, filmstrip, record, TV, radio, demonstration, computer, etc.

	10. LECTURE, DICTATING STUDENT READING	The teacher reads aloud, expresses his views, gives directions, makes an assignment, asks rhetorical questions, or writes on the blackboard, dictates information. Students are expected to listen. Student reading in the text is also included.
	11. SILENCE OR GENERAL HAVOC	The class may be cleaning up, settling down or doing nothing. In general, this category should be used sparingly.

Formula Used in Data Processing

Percentage proportion=Time occupied by a category /Time occupied by 1 to 11 categories x 100

Activity Ratio= number of intervals assigned to categories 1, 2, 3, 4, 5, and 6 divided by number of intervals assigned to categories 8, 9, and 10

Ground Rules to be followed in Using ACI for Classroom Video Encoding

The classroom activities are digitally recorded covering entire teacher and students' behaviors of the classroom. The digitally recorded behaviors are latter encoded into data sheet or SPSS Data sheet everyday as per following rules.

When two activities occur simultaneously in a five second interval, observers choose the category with the smallest number. For example, a teacher may be talking while showing a filmstrip (No. 9). If the teacher is telling students (No.10), observers record a 9. If teacher is asking a question (No.7), observers record a 7.

When two or more activities occur sequentially with a five-second interval, observer choose the activity which occupied the major portion. If this is not possible, observers choose the category with the lowest number.

Lulls during a lecture for purposes of note taking (No. 10). If lull occurs following teacher's question it is recorded as a question (No. 7).

If interval cannot be assigned a number, it is left blank. The situation should be explained in the margin as soon as possible.

Field trips are classified as Category 5.

A test is coded as "T".

Laboratory experiments: if distinctions between categories 1 and 2 cannot be made because the directions are non-verbal, then an "L" will be used until the directions can be examined. While students are predominantly reading directions, consider this as Category 10, directions.

When category No. 8 is applicable, the observer should check the materials. If the materials are thought provoking rather than "Look-up-the-answer" type, the observer will note this on the reverse side of the sheet.

Guest speakers are not recorded. "Guest speaker" is written across the blank interval.

Technical rules of Classroom Video Recording and Coding

Consent of the school authority, teacher and student is sought before entering for video recording sessions.

- The teacher and students are informed about the presence of video recording device during the class session of the subject teacher.
- The teacher and students are informed about researcher's duty to set device in classroom and time for its on and off.
- The device is set right before the subject teacher enters for his/her class. So that, all entire activities can be recorded and the teacher is not disturbed to start the lesson without wasting the time allocated.
- The video is valid for the research if it can record the real-time classroom activities in the scheduled session for the subject instruction by the school administration.
- The video recording occurs till the time the teacher remains in classroom. It is collected when teacher leaves the room.
- The video coding is started when a teacher formally starts teaching announcing topic, revisiting previous lesson, or writing topic on the board.

Ethics and Confidentiality in Classroom Observation/Recording

- As a researcher, I understand that ethics is the foremost concern that indicates the quality of research work. In this research, protection of the confidential information about the school, classroom, and participants is my ethical obligation. Considering the ethical obligation in research, my responsibility is to maintain ethics and confidentiality executing the following measures.
- I understand that school and classroom are formal settings and governed by systems and rules which should not be violated for the sake of research purposes.
- I understand that my classroom research starts with consent from the school authority as the research gatekeeper and the subject teacher as the key data source. The informed consent from the headteacher, subject teacher, and students is to be obtained prior to the classroom observation.
- I ensure that the usual classroom activities are not interfered with or disturbed in the process of classroom observation and recording.
- I understand that names and any other identifying information about the study sites, schools, classrooms, and participants are completely confidential.

- I understand that the data obtained from the classroom will not be used for other purposes than this research purpose or dissertation development and the development of research articles based on the dissertation.
- I ensure that my task in the school and classroom is not to get information about the site, school, classroom, or participants, or any other confidential documents, nor ask questions to the participants for my own personal information which is not regarded as my research tasks.
- I know that the research participants deserve to get information on the research result.
- I understand that the video clips are not to be disclosed except to the concerned supervisors, the research evaluation committee, or its members.
- I understand the sensitivity of the video clips of research participants that implies to me to blur, hide or make the picture anonymous one.
- I understand that the video clips become a useful asset to the research participants. They are regarded as a matter for sharing with them if they desire to keep with them, and observe and assess their classroom teaching behavior by themselves for further learning.

Signature

Karna B. Chongbang

Researcher

Graduate School of Education, TU

Date: 07/09/2021


Signature


Date:

Research Gatekeeper/ Participant

Appendix C: Letter of the GSE to Research Concerns for Field Work

Facilitation


TRIBHUVAN UNIVERSITY
FACULTY OF EDUCATION
GRADUATE SCHOOL OF EDUCATION
 M.Phil. Ph.D. Integrated Programme
 KIRTIPUR, KATHMANDU

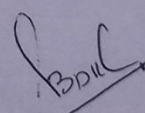

 Faculty of Education
 Dean's Office
 Graduate School of Education
 Kirtipur

29 March , 2021


TO WHOM IT MAY CONCERN

This is to certify that Mr. Karna Bahadur Chongbang, the 3th batch student at Tribhuvan University for Doctor of Philosophy in [REDACTED] Education, is conducting a research work on **Classroom Dynamism and Dynamics: A Study of Teacher and Student Behavior**. He is coming to visit your school/institution/ students/ teachers to collect necessary data and information related to classroom to complete his research work. We would highly appreciate it if you could kindly provide him with an access to the relevant information. Your support and cooperation would certainly encourage our students to enhance their knowledge in development of the study.

Thanking you for your cooperation.





 Prof. Binod Prasad Dhakal, Ph.D.
 Director

 0977 - 1 - 4334189, Email: tumphil@gmail.com , Fax: 0977 - 1 - 4333943

Appendix D: Consent Letter of the EDCU

नेपाल सरकार
शिक्षा विज्ञान तथा प्रविधि मन्त्रालय
शिक्षा तथा मानव स्रोत विकास केन्द्र
शिक्षा विकास तथा समन्वय इकाई
भक्तपुर ।





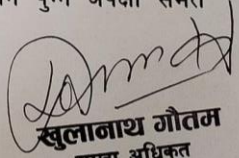
प.सं.०७७१०७८
च.नं. २५९

मिति : २०७७।१२।२४

विषय : अनुसन्धान कार्यमा सहयोग गरिदिने सम्बन्धमा ।

श्री प्रधानाध्यापक ज्यू,
श्रीविद्यालय,
भक्तपुर ।

प्रस्तुत विषयमा त्रिभुवन विश्वविद्यालय, शिक्षाशास्त्र संकाय अन्तर्गत **Graduate school of Education**, किर्तिपुरका पिएचडी शोधार्थी/अनुसन्धानकर्ता श्री कर्ण बहादुर चोइवाइले यस जिल्लाको विद्यालयहरुबाट **classroom Dynamism** तथा **Dynamics** सँग सम्बन्धित तथ्यांक संकलन सम्बन्धि कार्यका लागि यस कार्यालयमा निवेदन दिनुभएको हुनाले त्यस विद्यालयको तथ्यांक उपलब्ध गराइ आवश्यक सहयोग गरिदिनुहुन अनुरोध गर्दछु । वहाँको उक्त शोध कार्यले शिक्षणमा नयाँ ज्ञानको विकासमा योगदान पुग्ने अपेक्षा समेत गरिन्छ ।



सुलामाथ गौतम
शाखा अधिकृत

Appendix E: Sheet of Informed Consent Protocol Signed

Ethics and Confidentiality in Classroom Observation/Recording

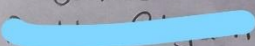



As a researcher, I understand that the ethics is the foremost concern which indicates quality of research work. In this research, protection of the confidential information about school, classroom, and participants is my ethical obligation. Considering the ethical obligation in research, my responsibility is to maintain the ethics and confidentiality executing the following measures.

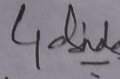
- I understand that school and classroom are formal settings and governed by system and rules which should not be violated for the sake of research purpose.
- I understand that my classroom research starts with the consent from school authority as research gatekeeper and subject teacher as key data source. The informed consent from headteacher, subject teacher, and students is to be obtained prior to the classroom observation.
- I ensure that the usual classroom activities are not interfered or disturbed in the process of classroom observation and recording.
- I understand that names and any other identifying information about the study sites, schools, classrooms, and participants are completely confidential.
- I understand that the data obtained from the classroom will not be used for other purpose than this research purpose or dissertation development and the development of research articles based on the dissertation.
- I ensure that my task in the school and classroom is not to get information about site, school, classroom, or participants, or any other confidential documents, nor ask questions to the participants for my own personal information which are not regarded as my research tasks.
- I know that the research participants deserve to get information of the research result.
- I understand that the video clips are not to be disclosed except to the concerned supervisors, research evaluation committee, or its members.
- I understand the sensitivity of the video clips of research participants that implies to me to blur, hide or make the picture of anonymous one.
- I understand that the video clips become useful asset to the research participants. They are regarded as matter for sharing to them, if they desire to keep with them; and observe and assess their classroom teaching behavior by themselves for further learning.




 Signature
 Karna B. Chongbang
 Researcher
 Graduate School of Education, TU

Date: 07/09/2021

Signature
 Research Gatekeeper/ Participant

Congented
 Khadka
 9849 
 ra  hadka55@gmail.com


Date: 

Permitted.
 4.  Khadka,
 9851 
 Khadkagb@yahoo.com

Appendix F: School for Instrument Piloting

School	Location	Head Teacher	Subject and Grade	Subject Teacher	Date	Teaching Schedule
A. Sec. School, Arubari	Gokarneshwor, Municipality-9	KN	Science, Grade 9	NBG	Sep 8, 2021	1 st Period 10.15-10.55 am
A Sec. School, Arubari,	Gokarneshwor, Municipality-9	KN	Science, Grade 10	NBG	Sep 12, 2021	3 rd Period, 12.00-12.40 pm
A Sec. School, Arubari	Gokarneshwor Municipality-9	KN	Science, Grade 9	NBG	Sep 13, 2021	1 st Period 10.15-10.55 am
A. Sec. School, Arubari,	Gokarneshwor Municipality-9	KN	Science, Grade 10	NBG	Sep 13, 2021	3 rd period, 12.00-12.40 pm
L. G. EB School	Suryabinayak Municipality-7, Suryabinayak	SR	Social Studies	AKB	Sep 24, 2021	1 st Period, 6.20-7.00 am
L.G. EB School	Suryabinayak Municipality-7, Suryabinayak	SR	Social Studies	AKB	Sep 26, 2021	1 st Period 6.20-7.00 am
L.G. EB School	Suryabinayak Municipality-7, Suryabinayak	SR	Science	ST	Sep 24, 2021	3 rd Period 8.00-8.40 am
L.G. EB School	Suryabinayak Municipality-7, Suryabinayak	SR	Science	ST	Sep 26, 2021	3 rd Period 8.00-8.40 am

Appendix G: School Subjects and Class Schedule

S.N.	Code	Name of the school	Address	Subject	Teaching Schedule
1	28207	B. Sec. School	Changunarayan Municipality-8, Charali	Science	10am – 10.40am
				Social Studies	12.50 pm -1.30pm
2	28094	S. S. Sec. School	Bhaktapur Municipality-8, Taulachhen	Science	2.50pm-3.25pm
				Social Studies	1.40pm-2.15pm
3	28199	G. Sec. School, Bharwacho	Bhaktapur Municipality-1, Bharwacho	Science	11.35am-12.15am
				Social Studies	10.10am-10.50am
4	28204	C. D. Sec. School	Changunarayan Municipality-6, Chagunarayan	Science	2.00-2.40 pm
				Social Studies	12.00-12.40pm
5	28014	C. Ma V	Changunarayan Municipality-1,	Science	2.40pm-3.20pm
				Social Studies	10am-10.40am
6	28027	J. Ma V	Bhaktapur Municipality-3, Khauma	Science	12.30pm-1.15pm
				Social Studies	11.45am-12.30pm
7	28145	L. G. EBS	Suryabinayak Municipality-7, Suryabinayak	Science	1.20-2.00pm
				Social Studies	3.45-4.20pm
8	28125	Q. English School	Changunarayan Municipality-6, Chagunarayan	Science	2.30pm -3.10pm
				Social Studies	11.20pm-12 noon
9	28083	N E English school	Changunarayan Municipality, dhuwakot-2, Changunarayan	Science	2.pm-2.40pm
				Social Studies	12.50pm-1.30pm
10	28047	M E Sec. School	Suryabinayak Municipality-8, Suryabinayak	Science	2.20pm -3.00pm
				Social Studies	10.00am-10.40am
11	28183	B. M.I Vidhyapeeth	Suryabinayak Municipality-10	Science	2.40pm-3.20pm
				Social Studies	12.10pm-12.50pm
12	28149	M. E. Sec. School	Bhaktapur Nagarpalika10, Mooldhoka	Science	3.20-4.00pm
				Social Studies	2.40-3.2pm
13	28202	F. E. School	Changunarayan Municipality-3,	Science	10.00-10.40am
				Social Studies	12.00- 12.40pm
14	28124	S. G. Ma. Vi.	Changunarayan Municipality-9, Chhaling	Science	12.50-1.30/ 1.30-2.10pm
				Social Studies	3.20-4.00pm

Appendix H: Sample Routine for Classroom Teaching

CLASS ROUTINE										
Days	10:10-10:50	10:50-11:30	5 Mins Break	11:35-12:15	12:15-12:55	12:55-1:35	Tiffin Break	2:10-2:50	2:50-3:30	3:30-4:10
10	Science RT	Account NP		Math US	English JB	Social GR		HPE LSD	Nepali SNK	Eco-RP Opt-KGA
9	Social LSS	English JB		Science RT	Math US	Account NP		Nepali SNK	Opt-KGA Eco-RP	Science-RT English-JB
8	Science RP	English SN		Nepali SNK	Social LSS	Opt-KGA Occup-LSD		Math US	Comp-NP Khwopa-GR	Health-LSD Moral-GR
7	English SN	Nepali LSN		Science NP	Opt/Health KGA	Occ/Moral RP		Social LSS	Khwopa-GR Comp-NP	Math US
6	Math US	Science RP		Khwopa-LSD Nepali-LSN	Health RT	Nepali LSN		English SN	Comp JB	Social LSS
5	Computer JB	Math KGA		English LSS	Nepali GT	Science RT		Khwopa LSN	Social LSD	English II-SN Nepali-SNK
4	Science KGA	Social LSD		Computer JB	English SN	Math KB		Nepali GT	English-SN	Khwopa LSN
3	Social LSD	Math KB		Nepali GT	Khwopa BK	Science SNK		Math KB	English RT	Nepali GT
2	Science SNK	Social GT		Khwopa BK	Math KB	English GT		Nepali IS	Nepali IS	Math KB
1										
UKG										GRADE TEACHING
LKG										GRADE TEACHING
NUR										GRADE TEACHING
PG										GRADE TEACHING

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Appendix I: Videos Recorded in the Classroom

Classroom Video Recordings

S.N.	School	Teacher	Video Clips								
			1	2	3	4	5	6	7	8	
1.	C28207	SciBT	20220221_10207	20220223_102145	20220228_102642	20220302_102057	20220303_101622				
		SSiKD	20220221_124755	20220223_125509	20220224_125531	20220228_125530	20220303_110051				
2.	C28094	SciKPS	20211128_144916	20211130_144812	20211201_150223	20211216_145140	20211217_145340	20211220_145606			
		SSiRSK	20211201_134947	20211202_135311	20211216_134624	20211217_134328	20211220_134744	20211221_134303			
3.	C28199	SciRT	20211117_114048	Subject drop-out							
		SSiLSS	20211117_102731	20211118_101517	20211121_101607	20211122_102014	20211123_101203	20211124_101103	20211125_101902		
4.	C28204	SciSBR	20220307_140646	20220309_140633	20220310_140600	20220313_140525	20220315_140507	20220316_140829			
		SSiMT	20220307_121103	20220309_120426	20220310_120355	20220313_120655	20220315_120631	20220316_120325			
5.	C28014	SciPG	20211223_105408	20211228_105535	20211229_105720	20220220_074401	20220221_070854	20220222_082046	20220223_082434		
		SSiJP	20211223_101516	20211224_101040	20211226_101214	20211227_101253	20211228_101814	20211229_101728			
6.	C28002	1	Not got permission for classroom video recording								
		2									
7.	C28027	SciPMB	20211128_122409	20211129_122235	20211130_122230	20211201_122456					
		SSiMPN	20211128_114758	20211129_114552	20211130_114548	20211205_114619	20211220_114719	20211221_114558			
8.	I28145	SciST	20210924_075044	20210926_075009	20211118_132024	20211121_131821	20211122_132412	20211125_132053			
		SSiARB	20210924_062321	20210926_061908	20211119_154652	20211121_154630	20211122_154836	20211123_154906	20211124_160234	20211125_154704	
9.	I28125	SciRSK	20220220_152236	20220221_152148	20220223_152153	20220224_152316	20220228_151920				
		SSiGBK	20220215_114702	20220220_114233	20220221_113643	20220223_113430	20220224_113650	20220228_112741	20220302_113508		
10.	I28041	SciAR	20211129_095354	20211130_095036	Discarded due to the research participants' high reactivity and unnatural classroom behavior						
		SSiPTB	20211129_103136	20211130_103102							
11.	I28083	SciSP	20210926_125538	20210927_140353	20210928_140359	20210930_140448	20211001_140539				
		SSiSA	20211223_125606	20211224_125431	20211226_125429	20211227_125434	20211228_125320				
12.	I28056	1	Not allowed for research								
		2									
13.	I28047	SciNM	20211212_142852	20211213_142254	20211214_142159	20211215_142333	Preparation for exam being held on saturday				
		SSiCKR	20211213_112643	20211214_112351	20211215_100124	20211216_100224					
14.	I28183	SciSB	20211205_144637	20211206_144835	20211207_144132	20211208_144722	20211209_144956	20211210_144420			
		SSiSL	20211206_121324	20211207_121437	20211208_121411	20211209_121435	20211210_121430				
The Replaced Three Videos instead of C28002, I28041, and I28056 Sample Schools											
1.	C28124	SciRL	20220320_130306	20220321_125637	20220324_125826	20220328_125918	20220329_125414				
		SSiSKC	20220403_152957	20220404_152741	20220405_152335	20220407_152530					
2.	Manakamana I28149	SciTPA	20220321_152400	20220322_152158	20220323_152401	20220324_152248	20220329_152352	20220330_152329			
		SSiBC	20220321_145128	20220322_144448	20220323_144305	20220324_144144	20220327_144344	20220328_144252			
3.	Fullbright I28202	SciCCG	20220322_100842	20220323_100156	20220324_100505	20220327_100049	20220329_100439	20220330_100113			
		SSiBCG	20220331_121344	20220403_120418	20220404_120340	20220406_120711	20220407_120450				

Appendix J: Valid Time for Coding of Videos

Video	Lesson Topic	Time Schedule	Time of Video Rec	Valid Time	Valid Total Time	Uncoded Video Time	Video 1
C28124551SKC_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28124551SKC_2	Labour	3.20-4.00 pm	3.27.41.4 01.47 pm	1910 sec	31 min a: 34 min and 27 sec		
C28124551SKC_2	Contemporary Ev	3.20-4.00 pm	3.23.35.4 01.09 pm	2190 sec	36 min a: 37 min and 15 sec		
C28124551SKC_2	Asia: Physical Fea	3.20-4.00 pm	3.25.30.4 05.44 pm	2260 sec	37 min a: 40 min and 58 sec		
C28204551MT_2C	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28204551MT_2C	Comparison of As	12.00-12.4	12.04.2 12.48.13 pm	2455 sec	40 min a: 43 min and 47 sec		
C28204551MT_2C	Comparison of As	12.00-12.4	12.05.3 12.41.20 pm	2130 sec	35 min a: 35 min and 45 sec		
C28204551MT_2C	Rana Regime: The	12.00-12.4	12.06.5 12.45.09 pm	2310 sec	38 min a: 38 min and 14 sec		
C28204551MT_2C	Rana Regime: The	12.00-12.4	12.06.3 12.43.48 pm	2070 sec	34 min a: 37 and 17 sec		
C28204551MT_2C	Time line	12.00-12.4	12.03.2 12.41.54 pm	2075 sec	34 min a: 38 min and 29 sec		
C28027551MPN_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28027551MPN_2	Right to Informati	11.45 am	11.45.5 12.22.27 pm	2015 sec	33 min a: 36 min and 35 sec		
C28027551MPN_2	Good Governance	11.45 am	11.45.4 12.22.2 pm	2065 sec	34 min a: 36 min and 14 sec		
C28027551MPN_2	Our Earth/Effect c	11.45 am	11.46.1 12.22.40 pm	1730 sec	28 min a: 36 min and 21 sec		
C28027551MPN_2	Physical Feature c	11.45 am	11.47.1 12.22.43 pm	2010 sec	33 min a: 35 min and 24 sec		
C28027551MPN_2	Climate of Nepal	11.45 am	11.45.5 12.21.58 pm	2045 sec	34. min a: 36 min		
C28014551SUP_20	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28014551SUP_20	National Pride, In	10.00 am	10.10.4 10.54.12 am	2290 sec	38 min a: 43 min and 32 sec		
C28014551SUP_20	Infrastructure	10.00 am	10.12.1 10.54.4 am	2230 sec	37 min a: 41 min and 59 sec		
C28014551SUP_20	Infrastructure, Cr	10.00 am	10.12.5 10.56.31 am	2345 sec	39 min a: 43 min and 38 sec		
C28014551SUP_20	Creative Use of T	10.00 am	10.18.1 10.54.41 am	1400 sec	23 min a: 36 min and 27 sec		
C28014551SUP_20	Arts	10.00 am	10.17.2 10.56.46 am	1980 sec	33 min a: 39 min and 18 sec		
C28199551LSS_2C	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28199551LSS_2C	National Luminar	10.10 am	10.15.1 10.49.33 am	1890 sec	31 min a: 34 min and 16 sec		
C28199551LSS_2C	8 National Lumin	10.10 am	10.16.0 10.35.04 am	990 sec	16 min a: 18 min and 57 sec		
C28199551LSS_2C	8 National Lumin	10.10 am	10.20.1 10.44.33 am	1370 sec	22 min a: 24 min and 39 sec		
C28199551LSS_2C	National Persona	10.10 am	10.12.0 10.51.44 am	1840 sec	30 min a: 39 min and 41 sec		
C28199551LSS_2C	National Persona	10.10 am	10.11.0 10.45.29 am	1630 sec	27 min a: 34 min and 26 sec		
C28199551LSS_2C	Our Past	10.10 am	10.19.0 10.51.56 am	1675 sec	27 min a: 32 min and 54 sec		
C28094551RSK_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28094551RSK_2	Physical Feature c	1.40 pm-2	1.53.11 2.17.58 pm	1445 sec	24 min a: 24 min and 47 sec		
C28094551RSK_2	Geater Nepal	1.40 pm-2	1.46.24 2.06.01 pm	720 sec	12 min a: 19 min and 37 sec		
C28094551RSK_2	Physical Feature c	1.40 pm-2	1.43.28 2.17.44 pm	1980 sec	33 min a: 34 min and 16 sec		
C28094551RSK_2	Physical Feature c	1.40 pm-2	1.47.44 2.16.29 pm	1655 sec	27 min a: 28 min and 45 sec		
C28094551RSK_2	Pirithivi Narayan S	1.40 pm-2	1.43.03 2.15.36 pm	2105 sec	35 min a: 35 min and 33 sec		
C28207551SKD_2C	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28207551SKD_2C	Nepal in Relation	12.50 pm-1	12.55.0 1.42.14 pm	1755 sec	29 min a: 47 min and 05 sec		
C28207551SKD_2C	Rana Regime: Cau	12.50 pm-1	12.55.3 1.39.16 pm	2210 sec	36 min a: 43 min and 45 sec		
C28207551SKD_2C	Rana Regime: Cau	12.50 pm-1	12.55.3 1.34.36 pm	2290 sec	38 min a: 39 min and 06 sec		
C28207551SKD_2C	Changes in Rana r	10.50 pm-1	11.00.5 11.33.06 am	1860 sec	31 min a: 32 min and 15 sec		
I28145551ARB_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28145551ARB_2	Modern Agricultu	3.45 pm-4.3	3.46.30 4.19.45 pm	1900 sec	31 min a: 33 min and 15 sec		
I28145551ARB_2	Importance of Ag	3.45 pm-4.3	3.48.36 4.33.59 pm	2700 sec	45 min a: 45 min and 23 sec		
I28145551ARB_2	Agriculture in Ne	3.45 pm-4.3	3.49.06 4.29.4 pm	2275 sec	37 min a: 39 min and 58 sec		
I28145551ARB_2	Modern Agricultu	3.45 pm-4.3	3.42.34 4.38.01 pm	1875 sec	31 min a: 35 min and 27 sec		
I28145551ARB_2	Modern Agricultu	3.45 pm-4.3	3.47.04 4.14.46 pm	1595 sec	26 min a: 27 min and 42 sec		
I28125551GBK_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28125551GBK_2	Peace and order	11.30 am-1	11.42.3 12.13.45 pm	1720 sec	28 min a: 31 min and 12 sec		
I28125551GBK_2	School as Zone of	11.30 am-1	11.36.4 12.15.38 pm	2190 sec	36 min a: 38 min and 55 sec		
I28125551GBK_2	Peace in School	11.30 am-1	11.34.3 12.13.02 pm	2045 sec	34 min a: 38 min and 32 sec		
I28125551GBK_2	Unit in Diversity	11.30 am-1	11.36.5 12.12.24 pm	2010 sec	33 min a: 35 min and 34 sec		
I28125551GBK_2	Issues of Nationa	11.30 am-1	11.27.4 11.39.05 am	620 sec	10 min a: 11 min and 24 sec		
I28125551GBK_2	Australia	11.30 am-1	11.35.0 12.12.09 am	2170 sec	36 min a: 37 min and 01 sec		
I28083551SA_20	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28083551SA_20	Contribution of E	12.50 pm-1	12.54.3 1.30.44 pm	2070 sec	34 min a: 36 min and 13 sec		
I28083551SA_20	Entrepreneurship	12.50 pm-1	12.54.2 1.30.43 pm	1940 sec	32 min a: 36 min and 14 sec		
I28083551SA_20	Employment Prog	12.50 pm-1	12.54.3 1.30.40 pm	2030 sec	33 min a: 36 min and 06 sec		
I28083551SA_20	Labour	12.50 pm-1	12.53.2 1.31.14 pm	2040 sec	34 min a: 37 min and 54 sec		
I28047551CKR_2C	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28047551CKR_2C	Donor Countries	10.0 am-10	11.23.5 12.01.06 pm	1910 sec	31 min a: 37 min and 15 sec		
I28047551CKR_2C	Nepal in the Unit	10.0 am-10	10.01.2 10.40.0 am	1755 sec	29 min a: 38 min and 36 sec		
I28047551CKR_2C	Contribution of N	10.0 am-10	10.02.0 10.40.05 am	1850 sec	30 min a: 37 min and 41 sec		
I28183551SL_202	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28183551SL_202	Anglo-Nepal War	12.10 pm-1	12.14.3 12.41.05 pm	1560 sec	26 min a: 26 min and 28 sec		
I28183551SL_202	Anglo-Nepal War	12.10 pm-1	12.14.1 12.50.05 pm	2080 sec	34 min a: 35 min and 52 sec		
I28183551SL_202	Anglo-Nepal War	12.10 pm-1	12.14.3 12.51.01 pm	2085 sec	34 min a: 36 min and 26 sec		
I28183551SL_202	Anglo-Nepal War	12.10 pm-1	12.14.3 12.51.02 pm	2045 sec	34 min a: 36 min and 32 sec		
I28149551BC_20	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28149551BC_20	Elements of Good	2.40 pm-3.3	2.44.48 3.21.50 pm	2130 sec	35 min a: 37 min and 02 sec		
I28149551BC_20	Asia: Physical Fea	2.40 pm-3.3	2.43.05 3.23.49 pm	2180 sec	36 min a: 40 min and 44 sec		
I28149551BC_20	Asia: Physical Fea	2.40 pm-3.3	2.41.44 3.22.42 pm	2260 sec	37 min a: 40 min and 58 sec		
I28149551BC_20	Europe: Introduct	2.40 pm-3.3	2.43.44 3.21.02 pm	2040 sec	34 min a: 37 min and 18 sec		
I28149551BC_20	Europe: Physical	2.40 pm-3.3	2.42.52 3.22.42 pm	2315 sec	38 min a: 39 min and 50 sec		
I28202551BCG_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
I28202551BCG_2	Nationality and S	12.00 - 12.4	12.04.1 12.40.47 pm	2005 sec	33 min a: 36 min and 29 sec		
I28202551BCG_2	Exercise	12.00 - 12.4	12.03.4 12.39.55 pm	1820 sec	30 min a: 36 min and 15 sec		
I28202551BCG_2	Notebook/Exercis	12.00 - 12.4	12.07.1 12.41.21 pm	1880 sec	31 min a: 34 min and 10 sec		
I28202551BCG_2	Notebook/Exercis	12.00 - 12.4	12.04.5 12.40.02 pm	1980 sec	33 min a: 35 min and 12 sec		
C28027551PMB_2	The first video clip observation is not encoded since it is thought with highly unusual behavior cause						
C28027551PMB_2	Chemical Reactio	12.20 pm-1	12.22.3 1.02.50 pm	2190 sec	36 min a: 40 min and 15 sec		
C28027551PMB_2	Chemical Reactio	12.20 pm-1	12.22.3 1.05.10 pm	1835 sec	30 min a: 42 min and 40 sec		
C28027551PMB_2	Chemical Reactio	12.20 pm-1	12.22.3 1.05.10 pm	1835 sec	30 min a: 42 min and 40 sec		

Appendix L: Frequency, Occurrence Time, and Percent Proportion of Behavior Categories in a Science Teacher's Class

1. Sample C28027SciPMB										
Instructional Behavior Categories in Grade-9 Classroom of C28027SciPMB based on the Second Day Observation										
		Frequency	Percent	Valid P	Cumulative Percent					
Valid	Student	75	12.8	17.1	17.1					
	Teacher	8	1.4	1.8	18.9					
	Notebook	28	4.8	6.4	25.3					
	Teacher	289	49.3	66	91.3					
	Silence	38	6.5	8.7	100					
	Total	438	74.7	100						
Missing	System	148	25.3							
Total		586	100							
Instructional Behavior Categories in Grade-9 Classroom of C28027SciPMB based on the Third Day Observation										
		Frequency	Percent	Valid P	Cumulative Percent					
Valid	Student	115	19.6	31.3	31.3					
	Teacher	5	0.9	1.4	32.7					
	Notebook	36	6.1	9.8	42.5					
	Teacher	194	33.1	52.9	95.4					
	Silence	17	2.9	4.6	100					
	Total	367	62.6	100						
Missing	System	219	37.4							
Total		586	100							
Instructional Behavior Categories in Grade-9 Classroom of C28027SciPMB based on the Fourth Observation										
		Frequency	Percent	Valid P	Cumulative Percent					
Valid	Student	47	8	10.6	10.6					
	Teacher	5	0.9	1.1	11.8					
	Notebook	105	17.9	23.8	35.5					
	Teacher	22	3.8	5	40.5					
	Teacher	256	43.7	57.9	98.4					
	Silence	7	1.2	1.6	100					
	Total	442	75.4	100						
Missing	System	144	24.6							
Total		586	100							
Total from the Above Tables										
Categories	Frequency of Time Interval of Instructional Activities based on Total Frequency							Time C	Percent Proportion	
	Obs1	Obs2	Obs3	Obs4	Obs5	Obs6	Obs7			
Student-c	1.Laboratory exper	0	0	0				0	0	0%
	2.Laboratory exper	0	0	0				0	0	0%
	3.Group works,	0	0	0				0	0	0%
	4.Student democ	0	0	0				0	0	0%
	5.Student lib. re	0	0	0				0	0	0%
	6.Student speak	75	115	47				237	1185	19%
	7.Teacher quest	8	5	5				18	90	1%
Teacher-c	8.Notebook wor	28	36	105				169	845	14%
	9.Teacher demc	0	0	22				22	110	2%
	10.Lecture	289	194	256				739	3695	59%
	11.Silence or ge	38	17	7				62	310	5%
Total			438	367	442			1247	6235	100%

Appendix M: Frequency, Occurrence Time, and Percent Proportion of Behavior Categories in a Social Studies Teacher's Class

14. Sample I28202SStBCG										
Instructional Behavior Categories in Grade-9 Classroom of I28202SStBCG based on the Second Day Observation										
		Frequency	Percent	Valid Perc	Cumulative Percent					
Valid	Student S	9	1.5	2.2	2.2					
	Teacher Q	4	0.7	1	3.2					
	Notebook	76	13	19	22.2					
	Teacher L	309	52.7	77.1	99.3					
	Silence or	3	0.5	0.7	100					
	Total	401	68.4	100						
Missing	System	185	31.6							
Total		586	100							
Instructional Behavior Categories in Grade-9 Classroom of I28202SStBCG based on the Third Day Observation										
		Frequency	Percent	Valid Perc	Cumulative Percent					
Valid	Student S	18	3.1	4.9	4.9					
	Teacher Q	5	0.9	1.4	6.3					
	Notebook	257	43.9	70.6	76.9					
	Teacher L	84	14.3	23.1	100					
	Total	364	62.1	100						
Missing	System	222	37.9							
Total		586	100							
Instructional Behavior Categories in Grade-9 Classroom of I28202SStBCG based on the Fourth Day Observation										
		Frequency	Percent	Valid Perc	Cumulative Percent					
Valid	Student S	22	3.8	5.9	5.9					
	Teacher Q	14	2.4	3.7	9.6					
	Notebook	113	19.3	30.1	39.6					
	Teacher L	198	33.8	52.7	92.3					
	Silence or	29	4.9	7.7	100					
	Total	376	64.2	100						
Missing	System	210	35.8							
Total		586	100							
Instructional Behavior Categories in Grade-9 Classroom of I28202SStBCG based on the Fifth Day Observation										
		Frequency	Percent	Valid Perc	Cumulative Percent					
Valid	Student S	14	2.4	3.5	3.5					
	Teacher Q	17	2.9	4.3	7.8					
	Notebook	125	21.3	31.6	39.4					
	Teacher L	204	34.8	51.5	90.9					
	Silence or	36	6.1	9.1	100					
	Total	396	67.6	100						
Missing	System	190	32.4							
Total		586	100							
Total from the Above Tables										
Categories	Frequency of Time Interval of Instructional Activities based on Video Obs							Total Freq	Time Occ	Percent Proportion
	Obs1	Obs2	Obs3	Obs4	Obs5	Obs6	Obs7			
Student-c	1.									
	2.Individual practica	0	0	0	0	0	0	0	0	0%
	3.Group work or proj	0	0	0	0	0	0	0	0	0%
	4.Student reports, pr	0	0	0	0	0	0	0	0	0%
	5.Fie ld-trip	0	0	0	0	0	0	0	0	0%
	6.Student speaking	9	18	22	14		63	315	4%	
	7.Teacher questionir	4	5	14	17		40	200	3%	
Teacher -c	8.Notebook work	76	257	113	125		571	2855	37%	
	9.Teacher demonstration		0	0	0		0	0	0%	
	10.Lecturing	309	84	198	204		795	3975	52%	
	11.Silence or Genera	3	0	29	36		68	340	4%	
Total		401	364	376	396		1537	7685	100%	

Appendix N: Time Calculation

0	Valid Time	Number o	Average Time in Second				
Social Studies							
C28124SStSKC_20220403_Obs1	0	0					Calculation of Total Time
C28124SStSKC_20220404_Obs2	1910	1					1910
C28124SStSKC_20220405_Obs3	2190	1					2190
C28124SStSKC_20220407_Obs4	2260	1					2260
	6360	3	2120				2455
							2130
C28204SStMT_20220307_Obs1	0	0					2310
C28204SStMT_20220309_Obs2	2455	1					2070
C28204SStMT_20220310_Obs3	2130	1					2075
C28204SStMT_20220313_Obs4	2310	1					2015
C28204SStMT_20220315_Obs5	2070	1					2065
C28204SStMT_20220316_Obs6	2075	1					1730
	11040	5	2208				2010
							2045
C28027SStMPN_20211128_Obs1	0	0					2290
C28027SStMPN_20211129_Obs2	2015	1					2230
C28027SStMPN_20211130_Obs3	2065	1					2345
C28027SStMPN_20211205_Obs4	1730	1					1400
C28027SStMPN_20211220_Obs5	2010	1					1980
C28027SStMPN_20211221_Obs6	2045	1					1890
	9865	5	1973				990
							1370
C28014SStJP_20211223_Obs1	0	0					1840
C28014SStJP_20211224_Obs2	2290	1					1630
C28014SStJP_20211226_Obs3	2230	1					1675
C28014SStJP_20211227_Obs4	2345	1					1445
C28014SStJP_20211228_Obs5	1400	1					720
C28014SStJP_20211229_Obs6	1980	1					1980
	10245	5	2049				1655
							2105
C28199SStLSS_20211117_Obs1	0	0					1755
C28199SStLSS_20211118_Obs2	1890	1					2210
C28199SStLSS_20211121_Obs3	990	1					2290
C28199SStLSS_20211122_Obs4	1370	1					1860
C28199SStLSS_20211123_Obs5	1840	1					1900
C28199SStLSS_20211124_Obs6	1630	1					2700
C28199SStLSS_20211125_Obs7	1675	1					2275
	9395	6	1565.833				1875
							1595
C28094SStRSK_20211201_Obs1	0	0					1720
C28094SStRSK_20211202_Obs2	1445	1					2190
C28094SStRSK_20211216_Obs3	720	1					2045
C28094SStRSK_20211217_Obs4	1980	1					2010
C28094SStRSK_20211220_Obs5	1655	1					620
C28094SStRSK_20211221_Obs6	2105	1					2170
	7905	5	1581				2070
							1940
C28207SStKD_20220221_Obs1	0	0					2030
C28207SStKD_20220223_Obs2	1755	1					2040
C28207SStKD_20220224_Obs3	2210	1					1910
C28207SStKD_20220228_Obs4	2290	1					1755
C28207SStKD_20220303_Obs5	1860	1					1850
	8115	4	2028.75				1560
							2080
I28145SStARB_20211119_Obs1	0	0					2085
I28145SStARB_20211121_Obs2	1900	1					2045
I28145SStARB_20211122_Obs3	2700	1					2130
I28145SStARB_20211123_Obs4	2275	1					2180
I28145SStARB_20211124_Obs5	1875	1					2260
I28145SStARB_20211125_Obs6	1595	1					2040
	10345	5	2069				2315
							2005
I28125SStGBK_20220215_Obs1	0	0					1820
I28125SStGBK_20220220_Obs2	1720	1					1880
I28125SStGBK_20220221_Obs3	2190	1					1980
I28125SStGBK_20220223_Obs4	2045	1					Total time in : 124000
I28125SStGBK_20220224_Obs5	2010	1					
I28125SStGBK_20220228_Obs6	620	1					
I28125SStGBK_20220302_Obs7	2170	1					
	10755	6	1792.5				

Appendix O: Teacher, Number of Videos, and Time

Calculated Total and Average Time for each Teacher's Session Observed				
Teacher	Total Time in Sec	Number of Videos	Avg. Time in Sec	Avg. Time in Min
C28124SStSKC	6360	3	2120	35 min and 20 sec
C28204SStMT	11040	5	2208	36 min and 48 sec
C28027SStMPN	9865	5	1973	32 min and 53 sec
C28014SStJP	10245	5	2049	34 min and 9 sec
C28199SStLSS	9395	6	1565.833333	26 min and 6 sec
C28094SStRSK	7905	5	1581	26 min and 21 sec
C28207SStKD	8115	4	2028.75	33 min and 49 sec
I28145SStARB	10345	5	2069	34 min and 29 sec
I28125SStGBK	10755	6	1792.5	29 min and 53 sec
I28083SStSA	8080	4	2020	33 min and 40 sec
I28047SStCKR	5515	3	1838.333333	30 min and 38 sec
I28183SStSL	7770	4	1942.5	32 min and 23 sec
I28149SStBC	10925	5	2185	36 min and 25 sec
I28202SStBCG	7685	4	1921.25	32 min and 1 sec
C28027SciPMB	6235	3	2078.333333	34 min and 38 sec
C28014SciPG	6990	4	1747.5	29 min and 8 sec
C28094SciKPS	9605	5	1921	32 min and 1 sec
C28207SciBT	7700	4	1925	32 min and 5 sec
C28124SciRL	7860	4	1965	32 min and 45 sec
C28204SciSBR	8990	5	1798	29 min and 58 sec
I28145SciST	7245	3	2415	40 min and 15 sec
I28125SciRSK	8695	4	2173.75	36 min and 14 sec
I28083SciSP	8695	4	2173.75	36 min and 14 sec
I28047SciNM	6740	3	2246.666667	37 min and 2 sec
I28183SciSB	9840	5	1968	32 min and 48 sec
I28149SciTPA	10890	5	2178	36 min and 18 sec
I28202SciSCG	11580	5	2316	38 min and 36 sec
	235065	118	1992.076	33 min and 12 sec

**Appendix P: Cross-relation of Curriculum Contents, Observed Contents,
and Classroom Video References of Science**

Unit	Content Areas	Observed Contents	Classroom Video References
	Physics		
1.	Measurement	x	
2.	Force	√	C28124SciRL_20220328_Obs4, C28124SciRL_20220329_Obs5
3.	Simple Machine	x	
4.	Work, Energy, and Power	√	C28094SciKPS_20211216_Obs4
5.	Light	√	I28125SciRSK_20220228_Obs5, I28047SciNM_20211213_Obs2 I28047SciNM_20211214_Obs3, I28047SciNM_20211215_Obs4 I28183SciSB_20211206_Obs2, I28183SciSB_20211207_Obs3 I28149SciTPA_20220322_Obs2, I28149SciTPA_20220323_Obs3 I28149SciTPA_20220324_Obs4, I28149SciTPA_20220329_Obs5 I28149SciTPA_20220330_Obs6
6.	Sound	x	
7.	Current, Electricity, and Magnetism	√	I28202SciSCG_20220323_Obs2, I28202SciSCG_20220324_Obs3 I28202SciSCG_20220327_Obs4, I28202SciSCG_20220329_Obs5 I28202SciSCG_20220330_Obs6
	Chemistry		
8.	Valency and Molecular Formula	√	C28094SciKPS_20211130_Obs2, C28094SciKPS_20211201_Obs3 C28204SciSBR_20220309_Obs2, C28204SciSBR_20220310_Obs3 C28204SciSBR_20220313_Obs4
9.	Chemical Reaction	√	C28027SciPMB_20211129_Obs2 , C28027SciPMB_20211129_Obs3
10.	Solubility	√	C28207SciBT_20220223_Obs2, C28207SciBT_20220228_Obs3
11.	Some Gases	√	C28207SciBT_20220302_Obs4, C28207SciBT_20220303_Obs5

			I28145SciST_20211121_Obs2, I28145SciST_20211122_Obs3
12.	Metals	x	
13.	Carbon and Its Compounds	√	I28145SciST_20211125_Obs4
14.	Water	x	
15.	Chemical Fertilizers Used in Agriculture	√	I28183SciSB_20211208_Obs4
	Biology		
16.	Classification of Living Things	x	
17.	Adaptation of Organism	√	I28083SciSP_20210927_Obs2, I28083SciSP_20210928_Obs3 I28083SciSP_20210930_Obs4, I28083SciSP_20211001_Obs5
18.	Systems	√	C28027SciPMB_20211129_Obs4 , C28094SciKPS_20211217_Obs5 C28094SciKPS_20211220_Obs6
19.	Sense Organs	√	I28183SciSB_20211209_Obs5, I28183SciSB_20211210_Obs6
20.	Evolution	x	
21.	Nature and Environment	√	C28124SciRL_20220321_Obs2, C28124SciRL_20220324_Obs3
	Geology and Astronomy		
22.	Natural Hazards	√	C28014SciPG_20220220_Obs4, C28014SciPG_20220221_Obs5 C28014SciPG_20220222_Obs6, C28014SciPG_20220223_Obs7
23.	Green House	√	I28125SciRSK_20220221_Obs2, I28125SciRSK_20220223_Obs3 I28125SciRSK_20220224_Obs4
24.	The Earth and The Universe	√	C28204SciSBR_20220315_Obs5, C28204SciSBR_20220316_Obs6
	24	17(70%)	54 videos

Appendix Q: Cross-relation of Curriculum Content Areas, Observed Contents, and Classroom Video References of Social Studies

	Content Areas	Observed Contents	Classroom Video References
	We and Our Society		
1.	Concept of Development of Society	X	
2.	Types of Society	X	
3.	Elements of Good Society	X	
4.	Socialization	X	
5.	Our Identity	X	
	Development and Infrastructure of Development		
6.	Concept of Development and Means and Resources	x	
7.	Pre-conditions of Development	x	C28014SSStJP_20211224_Obs2 C28014SSStJP_20211226_Obs3
8.	Infrastructure of Development	x	C28014SSStJP_20211227_Obs4
	Our Social Traditions, Values, and Norms		
9.	Introduction of Our Traditional Art	√	C28014SSStJP_20211229_Obs6
10.	Religious Tradition and Secularism	x	
11.	National Personalities and Contributions of National Heroes	√	C28199SSStLSS_20211118_Obs2, C28199SSStLSS_20211121_Obs3 C28199SSStLSS_20211122_Obs4, C28199SSStLSS_20211123_Obs5 C28199SSStLSS_20211124_Obs6

12.	Apathy and Cooperation	X	
13.	Peace Culture	X	
	Social Problems, Solutions and Our Responsibilities		
14.	Identification of Social Perversion	X	
15.	Contribution of Local and National Organizations and agencies	X	
16.	Efforts Made in Social Reform	X	
17.	Conflict, Causes of Conflict, Conflict Cycle and its Resolution	X	
	Civic Consciousness		
18.	Development of Constitution in Nepal and Constituent Assembly	X	
19.	Fundamental Rights provisioned in the Present Constitution	√	C28027SSStMPN_20211129_Obs2
20.	Civic Duties	X	
21.	Good Governance and Democratic Culture	√	C28027SSStMPN_20211130_Obs3, I28149SSStBC_20220322_Obs2
22.	Civic Society and Its Role	X	
23.	Peace Management	√	I28125SSStGBK_20220220_Obs2, I28125SSStGBK_20220221_Obs3

			I28125SSStGBK_20220223_Obs4
24.	Unity in Diversity	√	I28125SSStGBK_20220224_Obs5
25.	Nationality and National Concerns	√	I28125SSStGBK_20220228_Obs6, I28202SSStBCG_20220403_Obs2 I28202SSStBCG_20220404_Obs3, I28202SSStBCG_20220406_Obs4 I28202SSStBCG_20220407_Obs5
	Our Earth		
26.	Effects of Longitude on Time and Date	√	C28027SSStMPN_20211205_Obs4
27.	Physical Features of Nepal	√	C28124SSStSKC_20220407_Obs4, C28027SSStMPN_20211220_Obs5 C28094SSStRSK_20211202_Obs2, C28094SSStRSK_20211217_Obs4 C28094SSStRSK_20211220_Obs5
28.	Climate and Vegetation of Nepal	√	C28027SSStMPN_20211221_Obs6
29.	Status of Water Resource and its Use	X	
30.	Water Induced Disasters in Nepal	X	
31.	Map Work		
32.	Natural Resources, Economic Activities, Social Life	√	C28204SSStMT_20220309_Obs2, C28204SSStMT_20220310_Obs3 C28207SSStKD_20220223_Obs2, I28125SSStGBK_20220302_Obs7 I28149SSStBC_20220323_Obs3, I28149SSStBC_20220324_Obs4 I28149SSStBC_20220327_Obs5, I28149SSStBC_20220328_Obs6
	Our Past		
33.	Sources of History	√	C28199SSStLSS_20211125_Obs7
34.	Shakya Dynasty	x	
35.	Unification of Nepal	√	C28094SSStRSK_20211216_Obs3, C28094SSStRSK_20211221_Obs6
36.	Contribution of Nepali Warriors	√	I28183SSStSL_20211207_Obs2, I28183SSStSL_20211208_Obs3

			I28183SSStSL_20211209_Obs4, I28183SSStSL_20211210_Obs5
37.	Rise and Fall of the Rana Regime	√	C28204SSStMT_20220313_Obs4, C28204SSStMT_20220315_Obs5 C28204SSStMT_20220316_Obs6, C28207SSStKD_20220224_Obs3 C28207SSStKD_20220228_Obs4, C28207SSStKD_20220303_Obs5
38.	Industrial Revolution	X	
39.	Traditions, Customs, Cultures, and Lifestyle of Our Ancestors	X	
	Our Economic Activities		
40	Modern Agriculture System and Commercialization of Agriculture	√	I28145SSStARB_20211121_Obs2, I28145SSStARB_20211122_Obs3
41.	Types of Industries in Nepal and their Importance	√	I28145SSStARB_20211123_Obs4, I28145SSStARB_20211124_Obs5 I28145SSStARB_20211125_Obs6
42.	Diversification, Promotion, and Marketing of Trade	X	
43.	Introduction of Economic Planning	x	
44.	Contributions of Economic planning	√	I28083SSStSA_20211224_Obs2
45.	Entrepreneurship, Creation of Work, and Promotion of Market	√	I28083SSStSA_20211226_Obs3, I28083SSStSA_20211227_Obs4

46.	Types and Respect to Labour	√	C28124SStSKC_20220404_Obs2, I28083SStSA_20211228_Obs5
	Our International Relation and Cooperation		
47.	Relation and Cooperation with Donor agencies	√	I28047SStCKR_20211214_Obs2
48.	Role of Nepal in the UNO Activities	√	I28047SStCKR_20211215_Obs3
49.	Contribution of Nepal in the Establishment of International Peace	√	I28047SStCKR_20211216_Obs4
50.	Services and Facilities Provided by the Diplomatic Missions	x	
51	Effects of Current Affairs of the World on Human life	√	C28124SStSKC_20220405_Obs3
	51	24(47%)	64

Appendix R: Outline of Narrative Interview Guide (Teacher)

Phases		Rules and contents
Preparation		<p>Domain:</p> <p>Interaction and interrelation of teacher behavior with the complex dynamics systems of classroom</p> <p>Communication</p> <p>Communication for reminding the first phase classroom observation research and its background and process that had been shared with him/her and making mind to proceed for the second phase research collaboratively</p> <p>Sharing general information about the interview process and audio recording like in the previous classroom research</p> <p>Communication and confirmation of a suitable place and time for the interview in the school premise or any other place</p>
1	Initiation	<p>Formulating initial topic for narration:</p> <p>Early life, college education, and motivation towards teaching profession</p> <p>Rapport building with interviewee informal conversation and few researchers' lived experiences and asking permission for audio recording</p>
2.	Teacher keeps on narration; narrative interviewer keeps on track and poses questions for more and deeper	<p>Generally, no interruption</p> <p>Only non-verbal encouragement to continue story-telling</p> <p>Most of the time listening to the interviewee and wait for the end of the narration</p> <p>Turning the audio device on with participant's permission</p> <p>Formal entry into narration</p> <p>Welcome statement and presentation of a brief outline of the narrative interview</p> <p>Early life:</p> <p>Early life in family, family orientation</p> <p>Teachers' classroom teaching in the school life,</p> <p>Becoming teacher</p>

information but limited	<p>College study life (qualification, faculty, subject, theory, practical)</p> <p>Acquisition of content knowledge and skill/ content pedagogical knowledge and skill,</p> <p>Career assumptions and plans</p> <p>Professional motivation,</p> <p>Professional choice,</p> <p>Efforts, achievements</p> <p>Being teacher</p> <p>Entering the professional life, provisions and procedures</p> <p>Classroom behavior change through self- transformation</p> <p>Novice, advanced beginner,.....to expert</p> <p>Participation in teacher education and training program and learning and classroom practice</p> <p>Everyday classroom activities</p> <p>Teaching and learning behavior categories, i.e. lecturing, student speaking, project works, use of audio-visual devices, etc.</p> <p>Changing or static as you perceived (in your classroom life) and heard the past practices</p> <p>Skill and knowledge learning through practice and from school community(teachers, administrator, students</p> <p>Efforts of pedagogical transformation and impacts</p> <p>Pedagogical contents and skill and enacted pedagogical knowledge and skill</p> <p>Pedagogical content knowledge and skill and classroom instructional behavior</p> <p>Change in instructional system and context and classroom instructional behavior</p> <p>What shape classroom instructional behaviors?</p> <p>Curricular materials</p> <p>Teacher's guide</p> <p>Textbook</p>
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		<p>Infrastructure, Library, lab, instructional materials, etc. Teacher: Person, Professional agency, Change agent Student Local school system routine, school calendar, activity scheduling District policies and national policies: NCF and National education policy, Important incidents, or satisfactions and dissatisfactions on school and classroom activities, transformation, and accomplishments Life beyond classroom Social-economic activities Community welfare/social work Academic or scholarly works, etc. The heard instructional behavior of the past and enacted behavior in present classroom Prospects of classroom instructional life, instructional behavior and its dynamics</p>
3.	Questioning phase	<p>If any questions which were not possible to ask when the flow of narration was on and on. If things which are considered as essential information. Any feeling of pleasure and pain and satisfaction and dissatisfaction being a professional classroom teacher</p>
4.	Concluding talk	<p>Participant's concluding reflection on the lived experience interviewing Greetings to the research participant Audio recording ends Informal conversation Audio playback, if participant desires to it hear</p>

Adapted from Jovchelovitch and Bauer (2000)

Appendix S: Audio Records

002_C2820SStKD.m

005_C28027SciPMB.r

007_C28027SStMPN.

008_I28202SStBCG.n

Appendix T: Samples of Interview Transcripts

Interview Transcript

Participant Code: C28207SSStKD

Date: October 23, 2022; 7:15:39 am-09:04:00am

Place: School Headteacher's Office

Process: Audio/Voice Recording

KB: Could we start now, sir?

KD: Yes.

KB: It is related to the second phase of the study. In this phase, we are talking about different aspects of professional life which consist of family life, school, and university studies, professional entry, working in the system, opportunities within the system, professional development, and motivation towards the teaching profession which is expected picturizing a flow of professional life. These will be meaningful data for my study. Please, sir.

KD: From personal?

KB: Yes, sir.

KD: Ok. I understood. Now, I start it.

Interview Transcript

Participant Code: C28027SciPMB

Date: October 31, 2022; 12:35:15pm-2.00 pm

Place: School Headteacher's Office

Process: Audio/Voice Recording

KB: Shall we start, sir?

PMB: Yes.

KB: Since the professional entry, being a professional teacher, almost dimensions of life are interwoven into it. Our concentration remains in the classroom. Along with this, a change or transformation occurs within us. In this process of transformation, there may be a role of our anticipation and systemic intents and impacts of the system components. Encompassing all these things, please, could you share the experiential information about your early family life, school and college education and teaching practices and the specialization subjects that you studied, then professional entry, motivational sources towards the teaching profession, entry process, professional training, then first classroom teaching experience, teaching activities followed, classroom teaching practice change (if any) caused by the university study, training, or any other?

PMB: Ok.

KB: With your good name, please!

Interview Transcript

Participant Code: C28027SSStMPN

Date: November 1, 2022; 12:53:9pm-1:31:00 pm, in teacher's leisure time

Place: Open space at Bhaktapur Durbar square, nearby the school, Khouma, Bhaktapur

Process: Audio/Voice recording with permission

KB: Sir, please start it with your school student life, family background, college education, subjects studied, professional entry, motivation, training, career development opportunities, and their relation in classroom teaching and learning.

MPN: From personal?

KB: Yes, from personal, then professional, and horizontal involvement in different activities apart from the teaching, their positive and negative effects on

teaching, so that it would have reflected a life picture further including different incidents, satisfaction, and dissatisfactions, please sir.

MPN: Namaskar! My name is Madhav Prasad Neupane. I was born in Palpa district, Rampur municipality. We had a joint family. I studied up to grade seven at Shreejana Bikash Lower Secondary School, now it is a higher secondary school.

KB: In which year was that, sir?

Interview Transcript

Participant Code: I28202SSStBCG

Date: November 5, 2022; 4:15:249pm-5:04:00 pm, at tea shop

Place: Surya Vinayak Chowk, Bhaktapur, at tea shop

Process: Audio/Voice recording with permission

KB: Sir, it is the second phase of the research. The first was the classroom observation phase. From the first research, quantitative results have been drawn. Sir, I think you might have long teaching experience. You have cumulated many experiences in classroom teaching. You might have developed reflections. So, please let me get the information related to your school education, college education, and family background; and then teaching profession entry, the first classroom teaching experience, and activities in the first-time classroom teaching, with your good name first.

I was also a school teacher once. I also used to teach social studies at Jagat Mandir Boarding School, and many other schools. But currently, I am a university teacher.

BCG: I had also taught there. When were you there, sir?

Appendix U: NVIVO Output of QUAL Data Analysis

Name/Code Name, Coded Text, Count Values of Reference Number,

Name

Classroom Behavior and System Interfaces, "There should be the provision of an external evaluator to evaluate practical activities at last. Now, there is no monitoring system to check whether the practical activities are taking place or not." 1,

PMB

Classroom Behavior and System Interfaces, "When I studied and participated in the training programs, there were instructions about teaching. But within the system there is no instruction I have received yet about classroom activities, nor instructional monitoring from the upper system units. Training is organized by them for these all.",

1, PMB

Classroom Behavior and System Interfaces, "As I have been teaching, I have to go under what has been stated by the government, school administration, and program. There is a course determined for one year to be completed. For example, the government has designed the course program to complete by April. But we are compelled to complete it by November. We don't have any alternative except to complete it by November. Otherwise, the job in the school has to be quit. Parents also say the same thing, as child requires revision for high score. They have seen only the marks. But marks are nothing. There is the value of the child who fights with and hits their parents but secures marks A+. There is no value in writing exams, for the child who tends to chop, and hit their parents. ", 1, BCG

Classroom Behavior and System Interfaces, I have heard that there is the involvement of teachers as well in curriculum development. It is good. I am unknown of how that is being developed. What are the new contents added to it? There is no

orientation on the newly developed curriculum. We get information from the market about the curriculum change. There is a clear gap between the level of policy formulation system and implementation system between these there are different units like EDCU. But no touch with them.

, 1, PMB

Classroom Behavior and System Interfaces, "I see the fault is caused by the guardians of the private schools. The private schools work according to the wants of the guardians. Otherwise, the school cannot survive. If the guardians ask the school not to do this, the school does not do these things, because the school needs children from the parents." 1, BCG

Classroom Behavior and System Interfaces, "It may have become a rooted habit of the teachers. Some teachers want to change. But some other teachers are found using the same old teaching methods. I think the government is expected to monitor such things. In our country, there is no provision for reward and punishment. So, for them, however it occurs, it occurs. ", 1, MPN

Classroom Behavior and System Interfaces, "It was shared by a district education officer, KB, at the headteachers' meeting organized by Municipality. In his tenure, the meetings conducted by him were more progressive than the meeting at present. In the meetings with his presence, one or another new thing could be expected from him. The officers today spend time more scolding the headteachers. YKR, Resource Person (RP), was another person who also impressed me.", 1, KD

Classroom Behavior and System Interfaces , "Rather, after the new system of the local administrative body, the experts from the office came and observed my classroom teaching and they had given some feedback as well. There was feedback not on only negative but also on positive aspects. They had indicated weaknesses in

delivery and suggested improvement. This made me excited. If it is continued then it can somewhat improve classroom practice.” 1, PMB

Classroom Behavior and System Interfaces, There are no interactions between the systemic units about classroom instruction., 1, PMB

Classroom Behavior and System Interfaces, There was a supervisory system. That mostly tended to administrative practice of checking teachers absent and present and observing classroom teaching from windows. They had never given feedback on the instructional process. 1, PMB

Content Knowledge, I had been studying MA, 1, BCG

Content Knowledge, "I studied there majoring in Optional Maths. Then after, I studied IA with specialization subjects in Geography, Maths, and Nepali. I had to come to Kathmandu with my brother to join IA in the second year. Then, I studied at Ratna Rajya Campus, Kathmandu, and my brother joined Mahendra Ratna Camus Tahachal. Kathmandu. But, for the exam, I went to Tansen again. After the result of the I. A. examination, I came back to Kathmandu again and joined Ratna Rajya Campus, Kathmandu. Meantime, right after completing my first year, I had got opportunity to join the Jagriti School for teaching. ", 1, MPN

Content Knowledge, I used knowledge gained from college study., 1, PMB

Content Knowledge, "In college, there were separate theory and practical classes. The teachers would assign marks on the practical activities. The teachers used demonstration methods and lectures in college classroom teaching. There is scarcity of Physics and Chemistry teaching teachers. So, they had assigned classes for one month or some teachers for two months, and some of them were from India as well. It was very difficult to understand their language in the classroom. My study in Physics and Chemistry was deteriorating. In Biology, there were competent local teachers. So,

there was no problem with it. Then, after my Bachelor's degree, I joined Tribhuvan University, Kirtipur for a Master's degree. In between the result of my B. Sc. and University enrolment, I worked at a private school for eight months. When I was studying M. Sc. first year at the university, my course changed. I got an appointment for this job from the District Education office as a science teacher temporarily. At that time, science teachers were scarce for school education. The school administrators used to search for science teachers to run science classes.

", 1, PMB

Content Knowledge, "It was pure science affiliated with Tribhuvan University. I was in the second batch of that college in science faculty. I had studied Intermediate of science (I. Sc.). The score of the I. Sc. was not so high. So, I could not get admitted to Engineering and Bachelor of Medicine and Bachelor of Surgery (MBBS). I had to join B. Sc. For this study, I went and joined Trichandra Campus. I studied Biology there." 1, PMB

Content Knowledge, "My education was from Shree Janata Secondary School, Chandanpur, Sankhuwa-Sava. I passed the SLC examination in 1999 AD with second division.", 1, BCG

Content Knowledge, "My major subjects in the study were English, Political science, and History. The rest of the subjects were compulsory. After one year, my brother left the campus and got admitted to a campus located at Biratnagar. I also transferred my study to the same campus. The name of the campus was Janata Campus. I had passed I. A. from the campus. After that, I did not join the campus for nearly two years. I went back to my home village to help with house construction. Then, I came to Kathmandu in 2003 AD. I joined Tri-Chandra Campus for a Bachelor of Arts (BA). My major subjects in the study were English and Sociology.", 1, BCG

Content Knowledge, "PMB: The name of the school was Padma Secondary school, Bhaktapur, Durbar Square. From which I passed the SLC exam.

KB: When did you pass the SLC exam, sir?

PMB: In 2040 BS (1983 AD). I was a good student. I passed the exam with 1st division. At that time, there was a trend to join the science stream who could pass the SLC exam with 1st division. My aim, at that time, was not so much tended towards the government service [nokari]. As the trend was blowing, I joined Bhaktapur Campus to study general science. The morning shift for science study was just started.

", 1, PMB

Content Knowledge, "Teachers, KD, PG, and TPA, are from irrelevant content knowledge background. KD is from English, GP from Mathematics, and TPA also from Mathematics. KD is assigned as social studies teacher and PG and TPA are appointed as science teachers in the schools.", 1, Irrelevant Content Knowledge

Content Knowledge, "The studied subjects were as per the provisions of the government at that time. The SLC result was published in Ashad, 2000 AD. At that time there was a trend to leave the birthplace and move to either Terai or Kathmandu for higher education. Accordingly, I also, along with my father, descended Jhapa district in Terai. My elder brother had got admitted into Janata Multiple Campus, located in Jhapa, at Damak. I also got admission into the same campus. I studied certificate level, Intermediate of Arts (IA) there. ", 1, BCG

Curricular Dynamics-informed Behavior, , 0,

Curriculum Text in the Classroom Context, " That's why, I am saying it should be stated clearly in the curriculum making an obligatory condition to carry out practicals, field trips, and other activities. There should be the provision of an external evaluator to evaluate practical activities at last. Now, there is no monitoring system to

check whether the practical activities are taking place or not. So, they become obligatory to carry out the work. The field trips are organized but there is no learning purpose to this, neither the students prepare any reports on them nor connect curriculum intents.", 1, PMB

Curriculum Text in the Classroom Context, Curriculum is available., 1, PMB

Curriculum Text in the Classroom Context, It is downloaded from the CDC website. It is found in the market as well., 1, PMB

Curriculum Text in the Classroom Context, "Many teachers have not got the curriculum, though we have been adjusting the teaching as per the teaching hours allocated in the curriculum and the TG.", 1, MPN

Curriculum Text in the Classroom Context, "No, we manage ourselves.", 1, PMB

Curriculum Text in the Classroom Context, "The curriculum is just about what to teach, and its contents.", 1, BCG

Curriculum Text in the Classroom Context, "The curriculum which has been prepared for an academic year has not given teaching weightage for practical works. It has allocated teaching weightage for theory only. So, teachers/we are not feeling an obligation to engage the students in practical activities like laboratory work. ", 1, PMB

Curriculum Text in the Classroom Context, "The science course for grade 9 has been designed only for the theoretical portion that carries seventy-five marks. So far, as I have got information about the other schools, the schools which have an equipped laboratory have managed additional time for the practical work, since the lack of time to complete the theoretical course.", 1, PMB

Curriculum Text in the Classroom Context, There is the curriculum., 1, MPN

Instructional Activity Preference, Activities like question-answer and discussion are possible to carry out inside the classroom. , 1, BCG

Instructional Activity Preference, " As the result of video recording observation, student questioning and speaking based on content were comparatively higher than in the other teachers' classrooms", 1, PMB

Instructional Activity Preference, I have been mostly using discussion. I use interaction along with question-answer which causes their retention effective. They are assigned project works when they spend time on long school holidays or vacation., 1, KD

Instructional Activity Preference, "As I have already said, due to the time constraint, I have been using mostly lecturing. I have also sometimes used question-answer in the middle and end of the teaching. Out of the six days, the lecture method is used for four/five days in average.", 1, MPN

Instructional Activity Preference, "As mentioned in TG, instead of lab practical work, the teacher gives case studies, a collection of things, or any exercise. In my case, before giving practical marks to the students, I usually give an assignment to the students to study the simple machines found in their locality, draw their picture and write their use and purpose and submit them in a file. Likewise, they are asked to collect at least 5-10 plants found around their residence, paste them in copy with their local name rather than scientific name, write their utility may be in decoration and so, and submit it in a form of a file. For this, I teach the students the ways how to preserve them. ", 1, PMB

Instructional Activity Preference, "As per my subject, Social Studies, I generally use demonstration methods. For which the teaching materials like Atlas,

Map of Nepal, and maps of different countries are being shown to the students.

Likewise, discussion methods, and question-answer methods are used.", 1, MPN