THE JOURNAL OF DEVELOPMENT AND ADMINISTRATIVE STUDIES

Contents

Subscription rates for single issue:

Countries	Individual	Institutional
Nepal	Rs. 500	Rs. 750
SAARC Countries	US $ 25	US $ 40
Other Countries	US $ 50	US $ 70

Effectiveness of Digital Pedagogy in Higher Mathematics Education

Bed Prasad Dhakal, *Ph.D.*
Central Department of Education, Tribhuvan University
Email: bed.dhakal@cded.tu.edu.np;
ORCID ID: https://orcid.org/0000-0002-1510-5046

Abstract

The use of digital technology in education has revolutionized traditional teaching methods, particularly in mathematics education. This study aims to examine the effectiveness of digital pedagogy in higher mathematics education. The research question focuses on analyzing the effectiveness of digital pedagogy on students' APOS-based learning achievements in higher mathematics. The study used a quantitative research approach, employing a critical Action Research design with pre-and post-test measures to assess the effectiveness of digital pedagogy. The study participants were 126 third-semester students taking a course "Differential Geometry". The used tools are the DP model and mathematics achievement test (MAT). Based on the analysis of data, it is found that DP is effective to enhance APOS-based students learning. So, the study concludes that Digital Pedagogy in higher mathematics education provides insights into how educators can leverage technology to enhance student learning outcomes.

Keywords: Digital Pedagogy, APOS, Mathematics Education, Nepal

1. Introduction

Higher mathematics is abstract by its nature. Many researchers (e.g., Durand-Guerrier, 2016; Lockwood, Ellis, & Lynch, 2016; Zhen, Weber, & Mejia-Ramos, 2016; Dawkins & Roh, 2016) have accepted this fact. It is also proof-oriented mathematics. Proof is an essential component of doing, communicating, and constructing higher mathematics. It is clearly mentioned in the work of Stylianou, Blanton, & Rotou (2015) that the "essence of higher mathematics lies in proofs". Therefore, teaching and learning in higher mathematics mostly exist with definition-theorem-proof, definition-theorem-proof-based prototype style exist.

Mathematical abstraction can be materialized in a number of ways. Several types of research have demonstrated that mathematical abstraction can be materialized. For example, using examples (Durand-Guerrier, 2016; Lockwood et al., 2016), using graphical images (Zhen et al., 2016), using analogy (Dawkins & Roh, 2016)**,** and using metaphor (Durand-Guerrier, 2016)**,** researchers have tried to materialize mathematical abstraction. Some researchers have tried conceptual and ideational reasoning (Soto-Johnson, Hancock, & Oehrtman, 2016), metalinguistic and mathematical reasoning (Dawkins & Roh, 2016), procedural and conceptual reasoning (Bagley & Rabin, 2016), syntactic and semantic reasoning, cognitive and metacognition reasoning (Mejía-Ramos, Weber, & Fuller, 2015) to materialize proof oriented mathematics meaningfully.

 Researcher teaches mathematics courses to master's students in a teacher education programme at TU and covers many aspects from higher dimensions and abstract concepts. For example, in the DG course, it is hard for him to let students conceptualize that the "tangent line has two-point contact with the curve". Similar dynamics exist to him to let students understand that profs of the osculating plane and osculating circle have three-point contact with the curve, and the osculating sphere has four-point contact with the curve. So, the researcher feels it is necessary to materialize proof of higher mathematical abstraction.

In this new era of advanced digital technology, it may be a way forward that students need to consolidate their comprehension of mathematical concepts through visual pictures. The researcher sees that mathematical software

made interactive and dynamic learning objects are not tested/documented yet. In this aspect, He sees that there is a space to do pedagogical exercises with digital learning objects to materialize mathematical abstraction. Therefore, he felt necessary to investigate the potential of technology to materialize mathematical proofs and abstraction.

This study, therefore, is aimed at utilizing engaged, interactive, and technology-integrated meaningful digital pedagogy to internalize and formalize mathematical concepts in higher education. In this concern, the objective of this study is "to analyze the effectiveness of Digital Pedagogy in students learning higher mathematics".

2. Conceptual and Theoretical Framework

Digital Pedagogy (DP), in general, refers to the integration of digital media and technology into teaching and learning to emphasize the role of technology in facilitating students' learning. Digital pedagogy involves the use of digital tools and virtual learning environments to enhance students' engagement, creativity, and critical thinking skills in their learning process through a dynamic and interactive learning environment that empowers them to take their own control of their learning. With this, in this guideline, Digital Pedagogy (DP) is conceptualized as a planned pedagogical activity integrating ICT and 21st century skills to form a digital learning environment that enhances learners' autonomy and personalized learning. Preparation of the digital environment within DP consists of core pedagogical activities that should be taken systematically. Virtual Learning Environment (VLE)/Digital Learning Environment consists of a Learning Management System (LMS) with seven pedagogical principles.

1) Learning Contents/Curriculum Mapping
2) Setting Learning Outcomes
3) Selecting and organizing Learning Resources
4) Designing Learning Activities/Assignments
5) Ensuring Learning Communication/Interaction/Discussion
6) Learning Feedback/Support, and
7) Learning Assessment/Evaluation.

In this study, the theoretical perspective for DP is based on a constructivist approach of xpedagogy and cpedagogy. The xpedagogy is primarily based on the interaction with content adopting a constructivism learning approach. At the same time, cpedagogy is primarily based on social media to harness interaction with peers adopting a connectivism learning approach. In addition, the theoretical perspective includes the notion "higher the engagement/interaction higher the learning (social constructivism + tools) (Vygotsky, 1978; Siemens, 2005; Downes, 2005), higher the media, higher the learning (Mayer, 2009; Baddeley, 2007; Paivio, 1990) and based on the framework of APSO theory (Arnon, 2014).

APOS is a acronym for Action, Process, Object, and Schema. APOS is a constructivist-based theory of how mathematical concepts can be learned. Dubinsky, around 1983, began to think about it. He started applying Piaget's reflective abstraction into mathematics. At that time, Dubinsky was particularly interested in the use of computer experiences to help students to construct their mathematical concept. During the period 1985–1988, Dubinsky, with various collaborators, developed pedagogical methods using computer programming to induce students to internalize their actions into the process, processes into objects, and apply the relationships to learn new mathematical concepts as schemes, collectively called APOS (Arnon, 2014).
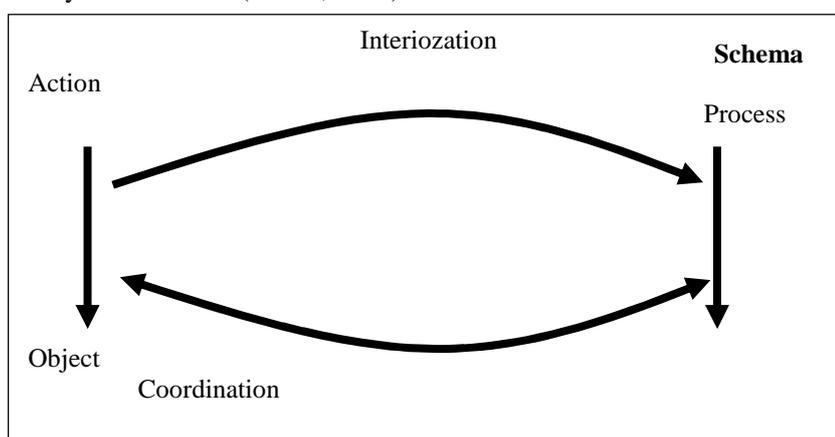

Figure 1: Actions, Processes, Object and Schema through GD

Action is a concept in APOS theory. The concept may be basic or complex, it depends on the context (Arnon et al., 2014). For example, "dividing an interval into specific subintervals of a given size, constructing a rectangle under the curve for each subinterval, calculating the area of each rectangle, and calculating a sum of areas of rectangles" can be an action to learn Riemann integral. Therefore, Action is an external transformation of an object, or manipulation of objects or facts.

Process is a mental structure in APOS theory. The essence of the process is to perform certain operations. The process is usually constructed using one of two mental mechanisms: interiorization or coordination. The main difference between action and process is that, for an action, one must transform (either physically or mentally), but for a process, one must carry out the transformation. For example, "to be able to describe how the Riemann sum is determined decreasing mesh size" is a process to learn the Riemann integral (Arnon et al., 2014). Therefore, Process is internal transformation of an action.

Object is a dynamic structure/connection in APOS theory. This object forms when Action is encapsulated in a Process (Arnon et al., 2014). For example, when one can see area dynamics under a curve and the limit of the Riemann sum, then Object is formed. This Object is formed when Action is applied to Process (Riemann sum) and dynamism is internalized (Arnon et al., 2014). When learners are able to encapsulate the process (Riemann sum) into an Object (Limit of Sum is the area), then the object is formed. Therefore, object forms when students know the process as a totality and identify those transformations acts on it.

Schema is a larger mental structure in APOS theory. It is a new object as connected nodes that forms when Actions are interiorized into Processes, and Process is encapsulated into a mental Object (Arnon et al., 2014). It is complete package connecting how the structures are related and organized into a larger mental structure including Action, Process, and Object. For example, Riemann integral is a schema based on action, process and object as described above (Arnon et al., 2014). The important action for Scheme formation is encapsulation and de-capsulation of Actions applied to a Process and Object with their dynamism. It forms only after genetic decomposition.

Table 1: Examples of APOS

Activities	Explanation	APOS
[1] Dividing an interval into specific subintervals of a given size [2] Constructing a rectangle under the curve for each subinterval. [3] Calculating the area of each rectangle [4] Calculating the sum of areas of rectangles	Action is carried out	A
[1] Can describe how the Riemann sum is determined by decreasing mesh size	Action is automated	P
The area under the curve for a function on a closed interval is the limit of Riemann sums.	Action applied to the Riemann sum (Process)	O
Calculated R-Integral	Student encapsulated the Riemann sum (Process) into an Object	S

Genetic decomposition (GD) in APOS is a model to describe Schema. GD describes specific mental structures in a model required to construct mathematical concepts, in a particular context (Arnon et al., 2014). The model of GD is first outlined, observed, tested in iteration, and validated. For example, in the context of the Riemann integral, if most students "divide an interval into specific subintervals of a given size, construct a rectangle under the curve for each subinterval, calculate the area of each rectangle, and calculate the sum of areas of rectangles" (Arnon et al., 2014). Then it can be considered as an Action in the model. Otherwise, if it is found that students construct the concept differently, than described, then new action needs to be designed until it is validated. The architecture work in a similar manner for Process and Object. And finally, GD will be prepared to describe the model (Arnon et al., 2014).

APOS theory works on spiral hierarchy. It assumes that students can learn any mathematical concept if they are provided with the necessary structures to understand. The main essence of APOS theory is to teach mathematical concepts using a model of the schema (Arnon et al., 2014). Once the model of schema via genetic decomposition is validated, then it can be used as a model for further teaching/learning, and it is supposed to contribute to the construction of the mathematical concept (Arnon et al., 2014). But need to be aware that a genetic decomposition may be different even for the same mathematical concept, in different contexts.

APOS theory is ground to create context-specific model to generalize knowledge construction schema in mathematics in a spiral hierarchy, any content can be learned at any time provided we supply the required backgrounds. It is also tool based, and more importantly, it has also been used to study different complex concepts of mathematics.

3. Methods and Materials

This study is carried out to analyze the effectiveness of DP in higher mathematics education. In this study, Iinquire with pragmatic paradigm because pragmatic paradigm-based research deals with constructed reality. Creswell mentioned that this type of research activity is more problem based and involves appropriate strategies to overcome the existing problem (Creswell, 2014).

This study is based on an experimental sort of educational research method that is "I-we" form Action Research (AR). In general, there are three forms of AR. The researcher avoided the empirical/ technical form of AR (McNiff & Whitehead, 2006) because it tries to maintain the objectivity of the research field to see cause and effect relationship, like 'if x, then y', where results are generated by statistical analysis and can be applied and generalized, and replicable in similar conditions. The researcher also avoided the interpretive AR (McNiff & Whitehead, 2006), which tries to observe events in natural settings to describe and explain "what is being/doing there" and to understand "what is happening" and negotiate meanings about objectivity. Beyond both AR, the researcher utilized critical action research to analyze the effectiveness of DP. It is argued that critical AR is a collaborative approach of inquiry to engage "subjects: researcher" and "objects: participants" with an interest in common problems. Therefore, one cycle of AR was carried out in CDED during the academic year 2016 in a course Differential Geometry. Usually, action research is conducted in cycles, but that is taken for implementers'/practitioners' research. Here, the researcher is in academic research to utilize digital pedagogy for the experiment. This experiment was based on the intact group pre-test and post-test design. One possible way to minimize problems related to having no control group is to measure the same dependent variable in one group of participants before (pretest) and after (posttest) a treatment. Using this type of research design, it is possible to measure scores before and again following treatment, then compare the difference between pretest and post-test scores.

The study participants in this research were students of the Master programme in Mathematics Education at CDED in a course Differential Geometry during the 2017 semester. In this semester, 167 students were enrolled in Mathematics Education. However, 126 students participated in both pre-test and post-test surveys. Since a value of n as the sample size is greater than 100, it is enough to use inferential statistics, therefore, 126 students were considered as participants of this study.

The mathematics achievement test (MAT) was utilized as data collectiontool. This MAT was prepared to analyze students' level of thinking in four levels of the APOS dimension. In each level of APOS (action, process, object, and schema), there was one question in each semantic area. The reliability and validity of the APOS framework were established by a pilot test among five students' written test. To ensure the content and construct validity of MAT, the specification grid was validated through APOS. For this, students' responses were validated with an interview. For reliability, Cronbach coefficient alpha was calculated, which was 0.81, this indicated a 64% reliability factor, therefore accepted.

4. Results

In this study, the DP access score of 126 students was divided into three levels of percentile points: 33, 67, and 100. These levels were coded as low, moderate, and high levels of DP access.

Table 2: Students three cohorts in DP Access

Gender	DP Access Level (N)			DP Access Level (%)			Chi
	Low	Moderate	High	Low	Moderate	High	
Boys	39	38	34	92	90	81	3.17
Girls	3	4	8	8	10	19	

(N=126 of 167)

MAT was analyzed in relation to students' ability according to APOS theory. For this, students' MAT score was categorized according to their APOS ability group. For example, if a student were in Action level but not in the other three, s/he was tagged as an Action level ability student. If a student were in the Action, and Process level but not in other two, s/he was tagged as a Process level ability student. If a student were in Action, Process, and Object level but not in Schema level, s/he was tagged to object level ability student. If a student were in all four levels, s/he was tagged as Schema level ability student. Otherwise, the student was tagged as a varied-level ability student. The table below shows APOS-based student-level statistics.

Table 3 reported that 3 students (3 boys, 0 girls) were in the Action level ability group. This reporting indicated that 3 students were able to get an average or above score in Action level items, but they were not able to score average or above marks in the other three higher-level items according to the genetic decomposition model of APOS theory. Therefore, these 3 students were considered Action level students.

Table 3: APOS Student Level Statistics

Students	APOS Level				
	Action	Process	Object	Scheme	Varied
N	3	9	24	44	46
%	2	7	19	35	37
Boys	3	8	19	38	43
Girls	0	1	5	6	3

(N=126 of 167)

Table 3 reported that 9 students (8 boys, 1 girl) students were in the Process level ability group. This reporting indicated that 9 students were able to get an average or above score in Action level items and Process level items, but they were not able to score average or above marks in the other two higher level items according to the genetic decomposition model of APOS theory. Therefore, these 9 students are considered as Process level students.

Table 3 reported that 24 (19 boys, 5 girls) students were in Object level ability group. This reporting indicated that 24 students were able to get an average or above score in Action level items, Process level items, and Object level items, but they were not able to score average or above marks in Schema level items according to the genetic decomposition model of APOS Theory. Therefore, these 24 students are considered as Object level students.

Table 3 reported that 44 (38 boys, 6 girls) students were in the Schema level ability group. This reporting indicated that 44 students were able to get an average of the above score in all APOS level items according to the genetic decomposition model of APOS Theory. Therefore, these 44 students are considered as Schema level students.

Table 3 reported that 46 (43 boys, 3 girls) students were in the Varied level ability group. These 46 students have scored average or above marks in at least level of APOS Theory, but the level was not consecutive. Therefore, the results also indicated that 46 students were able to get an average of the above score either in Action level items, Process level items, or Object level items or Schema level items, but not in consecutive order on one level after another higher level.

Student achievement was analyzed based on DP access level. The one-way analysis of variance was applied for further analysis. This analysis across DP access level was conducted to compare pre-test results for mean differences across the groups.

Table 4: DP Access level and Student's pre-test score

Source	Sum of Squares	df	Mean Square	F
Between Groups	0.36	2	0.18	0.85
Within Groups	25.3	123	0.02	
Total	25.66	125		

This analysis of variance given in Table 4 showed that there is no significant difference between the pre-test mean score across the DP access level group of students, $F(2,122) = 0.85$, $p > 0.05$. This pretest score was the students' score in the second semester, which is the end-semester exam score of Math Ed 527; Projective Geometry. The analysis indicated that three groups of students according to DP access level have similar achievement in pre-test scores (Math Ed 527 Projective Geometry).

Table 5: DP access Level and Student's MAT score

Source	Sum of Squares	df	Mean Square	F
Between Groups	165.06	2	82.53	9.88
Within Groups	1027.74	123	8.36	
Total	1192.80	125		

(N=126 of 167)

After, the DP intervention, the analysis of the variance test was examined to test the students MAT score mean differences across the DP access level group of students'. The test given in Table 5 showed that the difference in the mean achievement of students in three DP access level groups was significant, $F(2,125) = 9.88$, $p < 0.05$. Therefore, it is indicated that DP intervention has made a significant difference in students' MAT scores.

In addition, a chi-square test of independence was performed to examine the relationship between DP access level and students' APOS level mathematics understanding.

Table 6: DP access and Student's APOS Level of Learning

M-VLE Access Level	APOS Level					Chi
	Action	Process	Object	Scheme	Varied	
Low	0	2	9	6	25	31.77***
Moderate	3	2	11	14	12	
High	0	5	4	24	9	

(N=126 of 167)

Table 6 given above shows that the relation between DP access level and students' APOS level mathematics learning is significant, ^{2} (8, N = 126) = 31.78, p<0.05. This result concluded that there is a significant relationship between DP intervention and students' APOS-level mathematics learning.

To ensure the effectiveness of DP intervention, students' end semester final score of Math Ed 537; Differential Geometry was taken as a post-test result.

Table 7: DP access Level and Student's Post-test score

Source	Sum of Squares	df	Mean Square	F
Between Groups	2.14	2	1.07	3.46
Within Groups	37.17	123	0.31	
Total	39.31	125		

(N=126 of 167)

This analysis of variance showed that there is a significance difference between the post-test mean score across DP access level, $F(2,125) = 3.46$, p<0.05. It indicated that three groups of students according to DP access level have different achievements in the post-test. It shows that DP intervention is effective to enhance student's students' mathematics learning.

5. Discussion and Conclusion

Digital Pedagogy has been increasingly adopted in mathematics education, particularly in the context of the APOS theory of mathematical learning. The APOS theory proposes that students' understanding of mathematical concepts involves four stages: actions, processes, objects, and schemas. Digital pedagogy is found effective in promoting students' learning at each of these stages.

Research has also shown that digital pedagogy can be effective for APOS mathematics learning. For example, a study by Koichu et al. (2019) found that a digital pedagogy intervention improved students' understanding of calculus concepts in terms of the APOS theory. The intervention included interactive animations, simulations, and problem-solving activities that allowed students to explore and manipulate mathematical concepts. Also, another study by Oliveira and Tall (2017) explored the use of dynamic geometry software in promoting APOS learning in geometry. The software allowed students to manipulate geometric figures and explore geometric properties, which facilitated their development of APOS schemas. The authors found that the use of dynamic geometry software promoted students' understanding of geometric concepts in terms of the APOS theory. Overall, the effectiveness of digital pedagogy in this study also evidenced that APOS-based mathematics learning is well-supported by Digital Pedagogy by providing seven pedagogical principles 1) Learning Contents/Curriculum Mapping 2) Setting Learning Outcomes 3) Selecting and organizing Learning Resources. 4) Designing Learning Activities/Assignments 5) Ensuring Learning Communication/Interaction/Discussion 6) Learning Feedback/Support, and 7) Learning Assessment/Evaluation. This DP provided interactive and engaging learning experiences that promote exploration and manipulation of mathematical concepts, thus digital pedagogy facilitated students' understanding of mathematics in terms of the APOS theory. Therefore, it is concluded that DP intervention is effective to enhance students' mathematics learning.

References

Arnon, I. (Ed.). (2014). *APOS theory: A framework for research and curriculum development in mathematics education*. New York: Springer-Verlag.

Baddeley, A. D. (2007). Working memory, thought, and action. Oxford; New York: Oxford University Press.

Bagley, S., & Rabin, J. M. (2016). Students' Use of Computational Thinking in Linear Algebra. *International Journal of Research in Undergraduate Mathematics Education, 2*(1), 83–104. doi: 10.1007/s40753-015-0022-x.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches (4th ed)*. Thousand Oaks: SAGE Publications.

Dawkins, P. C., & Roh, K. H. (2016). Promoting Metalinguistic and Metamathematical Reasoning in Proof-Oriented Mathematics Courses: A Method and a Framework. *International Journal of Research in Undergraduate Mathematics Education, 2*(2), 197–222. doi: 10.1007/s40753-016-0027-0.

Downes, S. (2005). *E-Learning 2.0 ~ Stephen Downes. ELearn Magazine.* Retrieved from http://www.downes.ca/post/31741

Durand-Guerrier, V. (2016). Conceptualization of the Continuum, an Educational Challenge for Undergraduate Students. *International Journal of Research in Undergraduate Mathematics Education, 2*(3), 338–361. doi: 10.1007/s40753-016-0033-2.

Koichu, B., Drijvers, P., & Ainley, J. (2019). The role of digital pedagogy in promoting APOS learning of calculus concepts. *Educational Studies in Mathematics, 100*(3), 227-246.

Lockwood, E., Ellis, A. B., & Lynch, A. G. (2016). Mathematicians' Example-Related Activity when Exploring and Proving Conjectures. *International Journal of Research in Undergraduate Mathematics Education, 2*(2), 165–196. https://doi.org/10.1007/s40753-016-0025-2

Mayer, R. E. (2009). *Multimedia learning (2nd ed)*. Cambridge; New York: Cambridge University Press.

McNiff, J., & Whitehead, J. (2006). *All you need to know about action research.* Retrieved from http://public.eblib.com/choice/publicfullrecord.aspx?p=326402

Mejía-Ramos, J. P., Weber, K., & Fuller, E. (2015). Factors Influencing Students' Propensity for Semantic and Syntactic Reasoning in Proof Writing: A Case Study. *International Journal of Research in Undergraduate Mathematics Education, 1*(2), 187–208. doi: 10.1007/s40753-015-0014-x.

Oliveira, H., & Tall, D. (2017). Dynamic geometry and the APOS theory: A conceptual analysis. International *Journal of Science and Mathematics Education, 15*(6), 1141-1159.

Paivio, A. (1990). *Mental representations: A dual coding approach.* Oxford: Oxford Univ. Press.

Siemens, G. (2005). *Connectivism: A learning theory for the digital age.* Retrieved from http://er.dut.ac.za/handle/123456789/69

Soto-Johnson, H., Hancock, B., & Oehrtman, M. (2016). The interplay between mathematicians' conceptual and ideational mathematics about continuity of complex-valued functions. *International Journal of Research in Undergraduate Mathematics Education, 2*(3), 362–389. doi: 10.1007/s40753-016-0035-0.

Stylianou, D. A., Blanton, M. L., & Rotou, O. (2015). Undergraduate students' understanding of proof: Relationships between proof conceptions, beliefs, and classroom experiences with learning proof. *International Journal of Research in Undergraduate Mathematics Education, 1*(1), 91–134. doi: 10.1007/s40753-015-0003-0.

Vygotsky, L. S. (1978). *Mind in Society.* New York; Dordrecht; London: Harvard University Press.

Zhen, B., Weber, K., & Mejia-Ramos, J. P. (2016). Mathematics majors' perceptions of the admissibility of graphical inferences in proofs. *International Journal of Research in Undergraduate Mathematics Education, 2*(1), 1–29. doi: 10.1007/s40753-015-0010-1.

World Population Situation with Special Reference to SAARC Countries

Pitambar Acharya
Central Department of Education, Tribhuvan University, Kirtipur
Email: pitambar.acharya@cded.tu.edu.np

Abstract

The main objective of this article is to analyze the demographic situation of SAARC countries. This article is based on descriptive analyses of the data derived from the World Population Data Sheet (Population Reference Bureau) 2006 and 2016. The world population reached 7.4 billion in 2016. It is unevenly distributed because less developed countries occupied 83 percent and more developed countries had 17 percent. Asia only occupied three-fifth (60.53%). In the SAARC region, India and Maldives are the countries with the highest and lowest population. Afghanistan had the highest fertility and mortality whereas Sri Lanka and Maldives had the lowest fertility and mortality. Sri Lanka, Maldives, and Bangladesh had life expectancy over 70 years. Afghanistan and Sri Lanka had the highest (44%) and lowest (25%) shares of the young population. However, the share of the old dependent population (65+ years) in the SAARC region was very low. Similarly, the highest and lowest urban percentages were found in Maldives (46%) and Sri Lanka (18%).

Keywords: Population, SAARC, fertility, mortality, urbanization

1. Introduction

Population denotes all individuals living together in a specific geographical area at a specified time. The population is changed with the interplay of birth, death, and migration as they are the vital elements/components for population change. Demographic measurements based on such components are helpful to analyze demographic data. The world population was estimated to be 256 million in 1 AD which reached 0.5 billion in 1650 (Bhende & Kanitkar, 1999). For the first time in human history, the world population reached 1 billion in 1804. It took 123 years to reach 2 billion in 1927; however, it took just 34 years for another billion to reach 3 billion in 1960. The duration for an increment of one billion had further decreased. Consequently, it took just 39 years for an additional 3 billion and it reached 6 billion in 1999. In 2011, it reached 7 billion (National Health Training Centre/Nepal, 2008).

The South Asian Association for Regional Cooperation (SAARC) was established in 1985 to promote the welfare of the people of South Asia through regional cooperation. Seven countries Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka are the founder members of the organization from its establishment. The number of member States reaches eight when Afghanistan became a member of SAARC in 2007 (CBS, 2016). The countries forming the regional cooperation, SAARC, are diverse in their natural resource endowment, size, population, economy, as well as many other characteristics. India is the largest (70% land of SAARC) country in all respects and touches all SAARC countries except Afghanistan. Bhutan and Nepal are landlocked whereas Maldives and Sri Lanka are island states. Pakistan shares its boundary with Afghanistan (Chowdury, 2004, cited in Sawhney, 2010).

2. Objectives

The main purpose of the article is to analyze the situation of the world population with special reference to SAARC countries. It aims at analyzing the demographic situation of SAARC countries regarding population size, age structure, fertility, mortality, and urbanization.

3. Research Design and Methods

This study is based on the descriptive analysis of data from the World Population Data Sheet for the years 2006 and 2016. The comparative tables with a calculation of percentages with the use of Excel were used. Similarly, some charts like trend lines, bar graphs, and pie charts had been used to analyze and present the data effectively. This study is based on secondary data. The main sources of information were the 2006 World Population Data Sheet and the 2016 World Population Data Sheet. Besides, Bhende and Kanitkar (1999), Pressat (1985), Siegel and Swanson (2004), UNFPA (2006), and other internet materials were also used.

4. Analysis and Interpretation

The data were analyzed by selecting some demographic characteristics like population size, fertility, mortality, age structure, and urbanization. The situation of SAARC countries had been compared with world more developed and less developed regions.

4.1 Population Size

The world population has crossed 7.4 billion in 2016. It is unevenly distributed. Out of that population (7418), only 1254 million (16.9%) population has been occupied by more developed regions whereas 6164 million (83.1%) population has been occupied by less developed regions. Only Asia occupies three-fifth (59.8%) or 4437 million of the world population. A decades ago (2006), the world population was 6555 million out of which more developed and less developed region occupied 18.55 percent and 81.45 percent respectively. Asia only occupied 60.53 percent followed by Africa at 14.10 percent. According to the population projection for the year 2050, the world population will be 9869 million out of which 13.4 percent are in more developed countries and 86.6 percent in less developed regions. At that time the share of Asia will be 54 percent followed by Africa (Table 1).
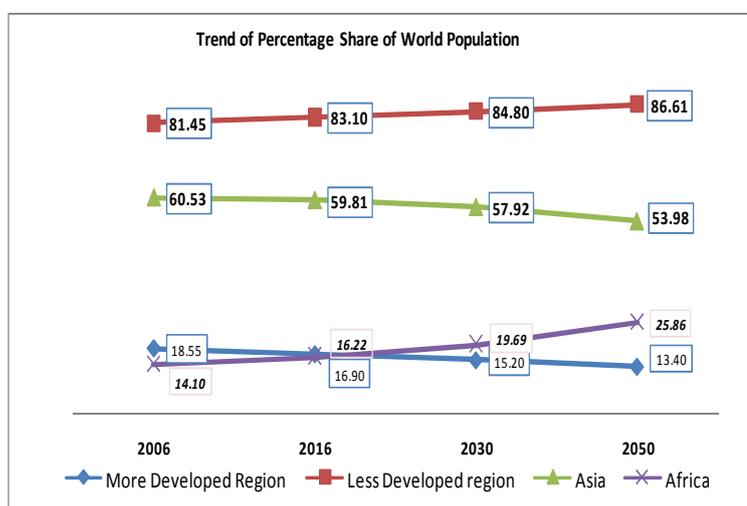
Figure 1: Trend of Percentage Share of World Population
(Source: Table 1)

Table 1: Size of Population by Selected Regions, 2006-2050.

Area	Population(Millions)			
	2006	**2016**	**2030**	**2050**
World	6555	7418	8539	9869
More Developed Region	1216 *(18.55%)*	1254*(16.9%)*	1298 *(15.2%)*	1322 *(13.4%)*
Less Developed region	5339*(81.45%)*	6164*(83.1%)*	7241*(84.8%)*	8548 *(86.6%)*
Asia	3968*(60.53%)*	4437*(59.81%)*	4946*(57.92%)*	5327*(53.98%)*
Africa	924*(14.10%)*	1203*(19.69%)*	1681*(19.69%)*	2527*(25.86%)*

Source: PRB (2006 & 2016), 2006 World Population Data Sheet, and 2016 World Population Data Sheet.

In the SAARC region in 2016, India is the largest country based on population size (1328.9 million) followed by Pakistan (203.4 million) and Bangladesh (162.9 million). Maldives has the least population. In comparison to 2006, the highest change (33.33%) was seen in Maldives, and the lowest change (-11.11%) was in Bhutan in 2016. Similarly, it is projected to be the highest change in Afghanistan followed by Pakistan both in 2025 and 2050, and the lowest change in Sri Lanka, even with a negative value (-3.2%) in Sri Lanka (Table 2).

Table 2: Size of Population by SAARC Countries, 2006-2050.

SAARC Countries	Pop^n(million) 2006	% change	Pop^n(million) 2016	% change	Pop^n(million) 2025	% change	Pop^n(million) 2050	% change
1. Afghanistan	31.1	-	33.4	7.40	45.5	36.23	62.4	37.14
2. Bangladesh	146.6	-	162.9	11.12	186.5	14.49	202.2	8.42
3. Bhutan	0.9	-	0.8	-11.11	0.9	12.50	1.0	11.11
4. India	1221.8	-	1328.9	8.77	1530	15.13	1708	11.63
5. Maldives	0.3	-	0.4	33.33	0.5	25.00	0.6	20.00
6. Nepal	26.0	-	28.4	9.23	33.3	17.25	36.4	9.31
7. Pakistan	165.8	-	203.4	22.68	265.6	30.58	344	29.52
8. Sri Lanka	19.9	-	21.2	6.53	21.9	3.30	21.2	-3.20

Source: PRB (2006 & 2016), 2006 World Population Data Sheet, and 2016 World Population Data sheet.

4.2 Fertility

Fertility is the childbearing performance of individuals, couples, groups, or populations (Pressat, 1985). It can be measured in various ways. Among them, Crude Birth Rate (CBR) and Total Fertility Rate (TFR) are common measures for which data can be available for international comparison. CBR denotes the annual number of births per 1000 population. TFR is the average number of children a woman would have assuming that current age-specific birth rates remain constant throughout her childbearing years, usually considered to be age 15 to 49 (PRB, 2006).

Both the CBR and TFR are found higher in less developed than the average value for the world and the more developed region with a slight decrease in 2016 in comparison to 2006. In the SAARC region, Afghanistan had the highest values of CBR (48, 37) and TFR (6.8 and 5.3) for both 2006 and 2016 followed by Pakistan and Nepal. The lowest value was observed in Sri Lanka for both periods. The highest rate (29%) of decline was observed in Nepal followed by Bangladesh (25.9%) and Afghanistan (22.9%) and the lowest (0%) decline in Maldives in terms of CBR for the period 2006-2016. Similarly, in terms of TFR, the highest rate of decline (37.8%) was found in Nepal followed by Bhutan (27.6%) and Bangladesh (23.3%). As per the data, TFR in Sri Lanka increased by 5 percent. The value for CBR and TFR for the period 2006 and 2016 has been mentioned in Table 3.

Table 3: CBR and TFR in Selected Regions and SAARC Countries, 2006-2016

Area	CBR (per 1000 population)		TFR (Per woman)	
	2006	2016	2006	2016
World	21	20	2.7	2.5
More Developed Region	11	11	1.6	1.7
Less Developed Region	23	22	2.9	2.6
Asia	20	18	2.4	2.1
SAARC Region				
1. Afghanistan	48	37	6.8	5.3
2. Bangladesh	27	20	3.0	2.3
3. Bhutan	20	19	2.9	2.1
4. India	24	22	2.9	2.3
5. Maldives	18	18	2.8	2.5
6. Nepal	31	22	3.7	2.3
7. Pakistan	33	30	4.6	3.7
8. Sri Lanka	19	16	2.0	2.1

Source: PRB (2006 & 2016), 2006 World Population Data Sheet, and 2016 World Population Data sheet.

4.3 Mortality

Mortality is a process whereby deaths occur in a population (Pressat, 1985) and it is another cause of population change. There are various measures and indicators of mortality. Crude Death Rate (CDR), Infant Mortality Rate (IMR), Maternal Mortality Ratio (MMR), and life expectancy at birth are popularly used while comparing the mortality situation among the countries and regions in the world. CDR is the total number of deaths per 1000 mid-year population in a year. According to PRB (2016), IMR is the annual number of deaths of infants under age 1 per

1,000 live births. Maternal mortality is the maternal deaths per 100,000 births. Maternal mortality can be defined as "the death of a woman while pregnant or within 42 days of the termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause to or aggravated by the pregnancy or its management but not from accidental or incidental causes" according to WHO. Life expectancy at birth is the average number of years a newborn infant can expect to live under current mortality rates.

CDR: In 2016, higher CDR was found in the more developed region (10 per 1000) than in the less developed region (7 per 1000). This is due to the effect of aging in developed regions. CDR for the World in 2016 is 8 per 1000 mid-year population which is a decrease in comparison to 2006 data. A similar decrease has also been observed in the less developed region (from 8 in 2006 to 7 in 2016). In the SAARC region, Afghanistan has the highest (8) CDR, and the Maldives has the lowest (3). Afghanistan had made tremendous progress (63.6%) to decrease CDR from 22 in 2006 to 8 in 2016 (Table 4).

IMR: It is one of the best indicators of socioeconomic development and health facility in a country. In 2016, there is still a huge gap in IMR between more developed (5) and less developed (39) regions despite the great achievement (31.6% decrease) in IMR in the less developed region (from 57 in 2006 to 39 in 2016 in a decade). Asia also experienced a significant decrease (36.7%) in IMR in a decade from 49 in 2006 to 31 in 2016 (Table 4).

Within the SAARC region in 2016, the highest IMR was observed in Afghanistan (68) followed by Pakistan (67). Similarly, the lowest IMR was found in Sri Lanka and Maldives, both had 8 as the value of IMR. The Highest achievement (59.0%) was observed in the decline of IMR of Afghanistan (166 in 2006 and 68 in 2016) followed by Nepal (64 in 2006 to 33 in 2016) with the achievement of 48.4 percent and Maldives(15 from 2006 to 8 in 2016) with the achievement of 46.7 percent. Despite the global decreasing trend of IMR, Bhutan's IMR was found to be increased (40 in 2006 in comparison to 44 in 2016). There might be an error in estimation because UNFPA (2006) mentions, in its State of World Population 2006 (page 95), that Bhutan had an IMR of 50 (Table 4).

Table 4: Mortality Indicators (CDR, IMR, Maternal Mortality and Life Expectancy at Birth) in Selected Regions and SAARC Countries, 2006-2016

Area	CDR		IMR		Maternal Mortality (Per 100,000 live births)		Life Expectancy at Birth (in years)	
	2006	**2016**	**2006**	**2016**	**(UNICEF,2005)**	**(PRB, 2016)**	**2006 (M, F)**	**2016 (M, F)**
World	9	8	52	36	400	216	65, 69	70,74
More Developed	10	10	6	5	13	12	73, 80	76,82
Less Developed region	8	7	57	39	440	239	64, 67	68, 72
Asia	7	7	49	31	-	122	66,70	71, 74
SAARC region								
1. Afghanistan	22	8	166	68	1600	396	41,42	59, 62
2. Bangladesh	8	5	65	38	380	176	61,62	71, 73
3. Bhutan	7	6	40	44	260	148	63,62	69,70
4. India	8	7	58	40	540	174	63,62	67,70
5. Maldives	3	3	15	8	140	78	64,72	76,78
6. Nepal	9	7	64	33	540	258	62,63	66,69
7. Pakistan	9	7	79	67	530	178	61,63	66,67
8. Sri Lanka	6	6	11	8	92	78	71,77	72,78

Source: PRB (2006 and 2016), 2006 World Population Data Sheet and 2016 World Population Data Sheet

*   UNICEF (2005).State of World Children 2006*

Maternal Mortality Ratio (MMR): Like IMR, MMR is also another important socio-economic and health indicator. Therefore, there is a huge gap in MMR in more developed regions and less developed regions as it was 12 and 239 respectively as per the data from the 2016 World Population Data Sheet. It was 216 for the world and 122 for Asia. It was about a 46 percent reduction in the MMR in the world and less developed countries in comparison to MMR reported by State of World Children 2006 published by UNICEF (Table 4).

In the SAARC region according to the 2016 World Population Data Sheet (WPDS), the highest MMR was found in Afghanistan (396) followed by Nepal (258). The lowest MMR was found in Sri Lanka and Maldives (78). While comparing the data of 2016 WPDS and the State of World Children (SWC) 2006 published by UNICEF, the highest rate of decline (75.25%) was observed in Afghanistan (from 1600 to 396) followed by India (67.8%) with a decline of MMR from 540 to 174. Similarly, the least rate of decline was observed in Sri Lanka (15.2%) followed by Bhutan (43.1%) (Table 4).

Life expectancy at birth: Like IMR and MMR, life expectancy at birth is also an important indicator of socio-economic development and health condition. It can be increased with the decrease in infant and child mortality. As there is a difference between male and female life expectancy, Table 4 shows the data on life expectancy by sex. Life expectancy at birth in 2016 was found to be over 70 for both sexes in the world (70 for males and 74 for females), in more developed regions (76 for males and 82 for females), and Asia (71 for males and 74 for females). In the less developed region, this value was 68 for males and 72 for females (Table 4).

In 2016, each country in SAARC had a higher life expectancy for females than males. Afghanistan had a life expectancy below 60 years, even if it was for males only. Sri Lanka Maldives and Bangladesh had life expectancy over 70 years. In 2006, only Sri Lanka had a life expectancy of over 70 years. Afghanistan had a life expectancy below 45(41 for males and 42 for females). The highest growth in life expectancy for both males (43.9%) and females (47.6%) was observed in Afghanistan and the lowest growth was observed in Sri Lanka (1.4% for males and 1.3% for females) (Table 4).

Based on the above discussion, it is clear that the mortality situation has changed well. However, still there is a need for hard work to be done to meet the level of more developed countries for the less developed countries.

4.4 Age composition

Age is one of the most important variables in the study of demographic analysis. UN (1998) defines age as "the interval of time between the date of birth and the date of the census, expressed in completed solar years" (Siegel, &Swanson, 2004). Age composition is the distribution of the population by age. Based on age composition, some populations are relatively young and have a large proportion of people in the younger age groups (less than 15 years). Less developed countries have relatively young populations and more developed countries have old or ageing populations (over 65 years). High-fertility countries have a large proportion of young adults and children (Haupt, & Kane, 2000).

Table 5: Percentage of population by age under 15 and over 65 years in Selected Regions and SAARC Countries, 2006-2016

Area	Percent of Population <15 years		% decrease	Percent of Population 65+ years		% increase
	2006	2016		2006	2016	
World	29	26	10.34	7	8	14.3
More Developed Region	17	16	5.88	15	18	42.9
Less Developed Region	32	28	12.50	5	7	28.6
Asia	29	25	13.79	6	8	28.6
SAARC region						
1. Afghanistan	45	44	2.22	2	2	0.0
2. Bangladesh	35	33	5.71	3	6	42.9
3. Bhutan	33	31	6.06	5	5	0.0
4. India	36	29	19.44	4	6	28.6
5. Maldives	33	27	18.18	5	5	0.0
6. Nepal	41	31	24.39	4	6	28.6
7. Pakistan	41	36	12.20	4	4	0.0
8. Sri Lanka	26	25	3.85	7	8	14.3

Source: PRB (2006 and 2016), 2006 World Population Data Sheet and 2016 World Population Data Sheet

In the world in 2016, slightly more than one-fourth (26%) of the population was found to be young dependent with a 10.3 percent decrease in comparison to 29 percent in 2006. The young dependent population was found 16 percent in more developed and 28 percent in less developed countries. Asia had one-fourth (25%) of the population as young in 2016 with a 13.8 percent decline from the value of 29 percent in 2006. Based on this discussion, the burden of young dependents is higher in less developed regions than in more developed regions. However, the scenario is reversed for the old dependent population. It is high in the more developed regions and low in the less developed regions. The percentage of the old dependent population in 2016 was 8 with a 14.3 percent increase from 7 percent in 2006. The more developed regions had an 18 percent old dependent population with an increase of 42.9 percent in the data 2006 with the 15 percent share of old dependent population. It was 7 percent for the less developed regions with a 28.6 percent increase in the data of 2006 (Table 5).

In the SAARC region, Afghanistan had the highest share (44%) of young population whereas Sri Lanka had the least share (25%) followed by Maldives (27%) and India (29%). Though Nepal had a 31 percent share of the young population in 2016, it had the highest decreasing rate (24.4%) from a value of 41 percent in 2006 followed by India (19.4%)from the value of 36 percent in 2006 to 29 percent in 2016. Similarly, Sri Lanka had the lowest decreasing rate(3.8%) from the value of 26 percent in 2006 to 25 percent in 2016(Table 5).

The share of the old dependent population (65+ years) in the SAARC region was very low. In 2016, its highest share was in Sri Lanka(8%) and lowest in Afghanistan (2%). Bangladesh experienced the highest increase (42.9%) followed by India (28.6%) and Nepal (28.6%). Within the 10 years interval, the increase in the share of the old dependent population was zero for Afghanistan, Bhutan, Maldives, and Pakistan (Table 5).

4.5 Urbanization

Urbanization is an increase in the proportion of a population living in urban areas. It takes palce when the urban population is growing more rapidly than the population as a whole (Pressat, 1985). In 2008, the United Nations announced that 50 percent of the world's population lived in urban areas which can be taken as a milestone in demographic history (Haub,2009). In 2016, more than half (54%) of the world's population was found urban whereas it was slightly less than four-fifth (78%) in more developed regions and about half (49%) in less developed regions. Though the less developed region had a lower urban percent, the rate of increment in its value was found higher (19.5%) than the more developed region (1.3%). This shows the increasing trend of urban percent in the less developed regions in the future also (Table 6).

Table 6: Urban percent in SAARC, 2006-2016

Area	Percent Urban		Increase %
	2006	**2016**	
World	48	54	12.50
More Developed Region	77	78	1.30
Less Developed Region	41	49	19.51
Asia	38	48	26.32
SAARC			
1. Afghanistan	22	27	22.73
2. Bangladesh	23	34	47.83
3. Bhutan	31	39	25.81
4. India	29	33	13.79
5. Maldives	27	46	70.37
6. Nepal	14	20	42.86
7. Pakistan	34	39	14.71
8. Sri Lanka	20	18	-10.00

Source: PRB (2006 and 2016)

In the SAARC region, the highest urban percent was found in Maldives (46%) followed by Bhutan (39%) in 2016. Similarly, the lowest urban percentage was found in Sri Lanka (18%) followed by Nepal (20%). In 2006, the highest urban percent was in Pakistan (34%) followed by Bhutan (31%), and lowest in Nepal (14%) followed by Sri Lanka (20%). The rate of decennial increment from 2006 to 2016 was found highest for Maldives (70.4%) followed by Bangladesh (47.8%). Except for Sri Lanka (-10%), all of the SAARC countries had an increase in urban percent in the past 10 years period (2006-1016).

5. Conclusion

The world population (7.4 billion in 2016) is unevenly distributed. Less developed countries have occupied 83 percent. Asia only occupied three-fifth (60.53%). In the SAARC region in 2016, India is the largest country based on population size whereas Maldives has the least population. In terms of fertility in the SAARC region, Afghanistan had the highest values of CBR (37 per thousand) and TFR (5.3 per woman) in 2016. The lowest value was observed in Sri Lanka. For mortality, Afghanistan had the highest CDR(8 per thousand) and Maldives had the lowest (3 per thousand). The highest IMR was observed in Afghanistan (68 per thousand) followed by Pakistan (67 per thousand). Similarly, the lowest IMR was found in Sri Lanka and Maldives, both had 8 per thousand. Afghanistan had the highest MMR (396 per 100,000 live births) followed by Nepal (258). The lowest MMR was found in Sri Lanka and Maldives (78). Similarly, each country in SAARC had a higher life expectancy for females than males. Afghanistan had a life expectancy below 60 years, even if it was for males only. Sri Lanka Maldives and Bangladesh had life expectancy over 70 years. In 2006, only Sri Lanka had a life expectancy of over 70 years. Afghanistan had a life expectancy below 45(41 for males and 42 for females). This shows the improvement in fertility and mortality situations in SAARC countries.

In terms of population by age in the SAARC region, Afghanistan had the highest share (44%) of the young population whereas Sri Lanka had the least share (25%) followed by Maldives (27%) and India (29%). However, the share of the old dependent population (65+ years) in the SAARC region was very low. Similarly, the highest urban portion was found in Maldives (46%) followed by Bhutan (39%) in 2016. Similarly, the lowest urban portion was found in Sri Lanka (18%) followed by Nepal (20%).

References

Bhenda, A., & Kanitkar, T. (1999). *Principles of population studies.* New Delhi: Himalaya Publishing House.

Central Bureau of Statistics [CBS] (2016). *SAARC in Figure 2016.* Kathmandu: CBS.

Haub, C. (2009). *What is a city? What is urbanization?* Retrieved September 16, 2016 from http://www.prb.org/Publications/ Articles/2009/urbanization.aspx

Haupt, A., & Kane, T. T. (2000). *Population handbook* (4th Ed.).Washington DC: Population Reference Bureau

National Health Training Centre/Nepal (2008). *Reference material on population studies in health sector.* Kathmandu: National Health Training Centre/Nepal

Population Reference Bureau [PRB] (2006).*2006 World Population Data Sheet.* Retrieved September 15, 2016 from www.prb.org/pdf06/06worlddatasheet.pdf

PRB (2016). *2016 World Population Data Sheet.* Retrieved September 15 from http://www.prb.org/pdf16/prb-wpds2016-web-2016.pdf

Pressat, R. (1985). *The dictionary of demography*. New York/England: Blackwell Publishing.

Sawhney, U. (2010). Growth and structural change In SAARC economies. *International Journal of Economics and Finance Studies, 2*(2), 95-103.

Siegel, J. S., & Swanson, D. A. (2004). *The methods and materials of demography* [A revised and improved version of a classic book on demographic methods]. California: Elsevier /Academic Press

United Nations Children's Fund [UNICEF] (2005). *The State of World Children 2006.* Retrieved September 16, 2016 from   http://www.unicef.org/sowc/archive/ ENGLISH/The%20State%20of%20the%20World's%20Children%202006.pdf

UNFPA (2006). *The State of World Population 2006*. New York: United Nations Population Fund.

Trend of Women Representation in Civil Service Bureaucracy in Nepal

Dila Ram Bhandari
Nepal Commerce Campus, Tribhuvan University
Email: drbhandari2012@gmail.com

Cite this paper

Abstract

Representative bureaucracy is a sign of inclusive and democratic governance. In this article, women's participation in Nepali bureaucracy is examined both qualitatively and quantitatively in light of the adoption of the reservation policy in 2007. This study aims to determine the extent to which Nepal's bureaucracy has evolved to reflect the demographics of the nation and whether it has improved in terms of citizen responsiveness after the establishment of a reservation policy. Gender-friendly practices are being implemented as the nation moves toward modernity. PSC and CBS secondary data are employed with descriptive statistics and inferential statistics (t-test and one-way ANOVA). Women's representation has increased through participation in the civil service, but they still mostly hold junior or non-gazetted posts. Citizens' evaluations regarding responsiveness and processes of service provision are also mixed.

Keywords: Gender, Bureaucracy, Civil Service, Reservation

1. Introduction

In order to address gender issues, the government of Nepal has undertaken numerous initiatives. These include the introduction of the National Gender Equality Act in 2006, the National Gender Equality Policy in 2007 and the National Gender Equality Program in 2008. The government has also taken measures to make education more accessible to girls, increase the representation of women in government, and introduce laws and policies that promote gender equality. Additionally, the government has also implemented programs to improve access to healthcare, improve nutrition, reduce gender-based violence, and empower women (MLJPA, 2015). In conclusion, gender issues in Nepal are multi-faceted and complex. The government has taken a number of initiatives to reduce gender inequality, but there is still a long way to go. In order to ensure that the benefits of development are shared equally, Nepal needs to continue to focus on creating an enabling environment for inclusive economic growth and development.

According to government policy, civil servants in Nepal are recruited by the Public Service Commission (PSC), often known as the public service. Women are becoming more prevalent in government positions. In 2012, there were 7% and 10%, respectively, of females at the officer and non-officer levels. Nonetheless, only 2.4% of all civil servants participate in policy and decision-making, making their presence there still quite limited.

Although there is still blatant evidence of gender discrimination, the percentage of women in the Nepalese civil service has increased from 8% a decade ago to 23% last year, according to recent statistics. In 2008-9, just 32,457 women applied for civil service jobs through the national examination system, but in 2017-18 that figure reached 296,704, according to the annual report of the Public Service Commission (PSC). Currently, 20,334 of the 87,753 workforce are women.

Table 1: Regional Data

Indicators	Afghanistan	Bhutan	Bangladesh	Pakistan	Nepal	India	Maldives	Sri Lanka
Population	35.53	0.81	164.67	197.02	28.21	1339.18	0.44	21.44
GDP	586	3110	1517	1548	835	1940	10536	4065
WLF (%)	19	58	33	25	83	27	43	35
WTSE (%)	3.6	8.9	14	9	12.2	27	20.5	22.9
GII	153	117	134	133	118	127	76	80
HDI	168	134	136	150	149	130	101	76

Source: World Bank Databank, UNDP, Population: Millions, GII: Gender Inequality Index UNDP (out of 189 countries), WLF: Women's labor Force, WTSE (Women Tertiary School Enrollment)

2. Research Questions

This study raises the following research questions:

- To what extent Civil Service has become inclusive?
- What is the perception level of Civil Servants towards inclusiveness and its impact on their attitudes or behavioral changes?

2. Objective of the Study

This study is founded on actual observations and experiences of women in the workplace, as opposed to theoretical methods, as well as on a critical examination of the situation of working women in Nepal. The goal of this study is to determine if the reservation policy implemented by the government of Nepal has effectively addressed the issues of exclusion in Nepal's civil service.

- What are the policy responses in solving problems of exclusion?
- Descriptive analysis of inclusiveness in civil service.
- Comparative analysis among reservations seats.

4. Literature Review

The literature shows that social exclusion has become a hindrance to the democratization process and removing such interruption reservation could be a rectification tool that helps to make the state inclusive. In the public administration literature, the debate concerning the representation of women and minorities in the public bureaucracy continues to attract significant attention.

Social inclusion is about participation, especially of the most disadvantaged people who are left out of the mainstream of development and in the governance process (Jackson, 1999). Social inclusion is the process of improving the terms for individuals and groups to take part in society. It is also a process of improving the ability, opportunity, and dignity of people, disadvantaged based on their identity, to take part in society (World Bank, 2013). Kingsley (1944) was attributed to contributing originally to the theory of representative bureaucracy, who observed if a workforce reflects the social composition. According to Roch and Pitts (2011), the concept of inclusion is used to "consider whether a public organization employs a bureaucracy that matches the general population. Social inclusion is about participation, especially of the most disadvantaged people who are left out of the mainstream of development and in the governance process (Jackson, 1999). Social inclusion is the process of improving the terms for individuals and groups to take part in society. It is also a process of improving the ability, opportunity, and dignity of people, disadvantaged based on their identity, to take part in society (World Bank, 2013).

According to Frazee (2003), people need both opportunities and assurances of welcome to make people socially active. She also argues that inclusion and equality are two distinct and complementary principles where equality stands for rights and inclusion for relationships. Freiler (2003) argues that social inclusion is the capacity and willingness of a society to keep all groups within the reach of what is expected from society.
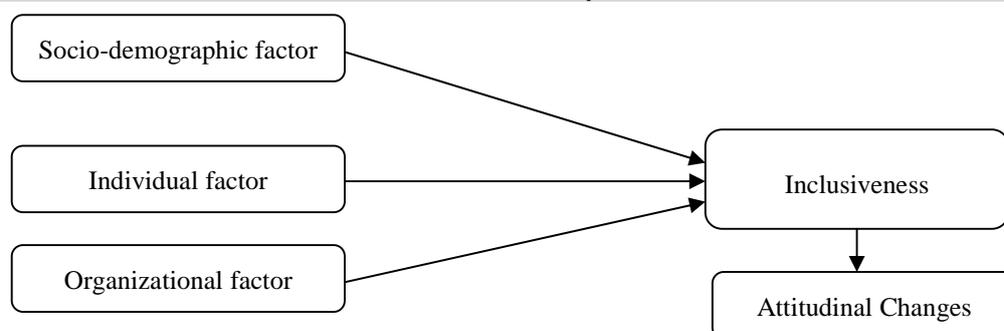
Figure 1: Theoretical Framework

Dependent variable

Inclusiveness is the equal participation and representation of women, marginalized, ethnic, and other caste groups in civil service and by increasing their access to social and economic spheres by creating opportunities with proportional representation in decision-making processes and guaranteeing recognition, identity, and social justice for them.

Independent Variable

- **Socio-demographic factors**: Gender, age, educational qualification, entry level position.
- **Individual factors**: Self-confidence, educational achievement, family support, skills and potentialities, and the motivational level of the respondents.
- **Organizational factors**: Challenges, performance, and level of satisfaction, and these indicators are measured based on the perception of the respondents towards the given factor.

Current Policy and Legal Provisions for Inclusive Civil Service

Reservation is a type of affirmative action used in Nepal to increase the participation of underrepresented groups that are generally determined by caste, handicap, and backwardness. There are both constitutional and statutory restrictions on discrimination based on gender, caste, backwardness, and disability. Nepal is a patriarchal society where women's roles are typically constrained to caring for the home and farming. Women have traditionally been assigned conventional responsibilities like cooking, cleaning the house, fetching water, and providing fodder while being cast in the shadow of their male counterparts. With the acceptance of numerous national laws and international conventions, including the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1991, Nepal has made commitments to abolish gender discrimination. Nepal pledged to work towards gender equality and the empowerment of women at the Fourth World Conference on Women in Beijing and committed to the Beijing Platform for Action.

Table 2: Total seat and Number of Civil Servants Nepal

S. N.	Service Type	Total Seat	Total Number of Working Civil Servants		
			Total	Female	Male
1	Economic Planning/ stat.	474	406	12.81	87.19
2	Engineering	12051	8496	13.56	90.64
3	Agriculture	5741	4785	13.56	86.44
4	Judiciary	4256	3515	14.85	85.15
5	Foreign Affairs	297	271	19.93	80.07
6	Administration	56510	33398	12.23	87.77
7	Auditing	378	349	12.32	87.68
8	Forest	7038	5870	9.93	90.07
9	Education	1834	1632	17.77	82.23
10	Health	32986	26785	46.94	53.06
11	Parliament	433	250	16.80	83.20
12	Miscellanea	5493	3282	43.78	56.22
Total		**127491**	**89039**	**23.72**	**76.28**

Source: PSC (2018)

Gender and Human Development

A composite score, the UNDP Gender Inequality Index (GLI) measures the discrimination that many women experience in the areas of reproductive health, secondary education, political representation, and the labor market.

Nepal ranked 115th out of 157 nations and territories in the 2015 UNDP Human Development Report (with the highest number indicating the worst degree of inequality). The Nepalese government has been enforcing policies that promote social inclusion and gender equality since 2010.

Acts, Regulation and Legal Provision

According to the reservation policy put in place after the Interim Constitution of Nepal was promulgated in 2007 (MLJ, 2007) clusters that qualify for reservation are given 45% of the civil service positions. Reservations are available for women, Dalits, members of marginalized groups, handicapped individuals, Madhesi, and people of indigenous descent. One of the key components of the wider system of government is the bureaucracy, which is a permanent institution in every country. This policy is regarded as a turning point in the effort to diversify the civil service.

The national policy on WID/tenth GAD's plan follows the strategy of mainstreaming gender, reducing gender inequality, empowering women, and acknowledging gender equality as a critical indicator of poverty analysis. We are unable to see the program's effectiveness, though. ADB Only 17% of civil service jobs are held by women, and this number is substantially lower in positions of significant decision-making. Men make up 48.56 percent of the population of the country, compared to women who make up 51.44%. The participation of men and women in public and political life is drastically different. Despite the introduction of reservations in the civil service (33 percent out of 45 percent), no particular procedures have been implemented at the senior level.

Table 3: Reservation in Civil Service, Nepal

S. No	Category	Percent (%)
1	Women	33
2	Adibasi/Janjati	27
3	Madhesi	22
4	Dalit	9
5	Disabled(differently able)	5
6	Backward Area	4

a. Allocation of 33% reserved seats out of a total of 45% reserved seats (when taken as 100%)
b. Five years relaxation on age bar for entrance i.e. 40 years for women candidates as against 35 years for men

Women's role in decision making

In Nepal, women's participation in decision-making is very limited. Although there is still blatant evidence of gender discrimination, the percentage of women in the Nepalese civil service has increased from 8% a decade ago to 23% last year, according to recent statistics. Just 32,457 women applied for civil service jobs through the national examination system in 2008–09, but 296,704 women did so in 2017–18. Currently, 20,334 of the 87,753 workforce members are women.

Table: 4 Gender-wise Trends of Applicants for Civil Service in the Last 12 Years

Fiscal Year	Total	Female		Male	
		Number	Percent	Number	Percent
2007/8	175122	67435	38.50	107677	61.5
2008/9	86168	32457	37.67	53711	62.33
2009/10	300463	139963	46.58	160500	53.42
2010/11	251651	110307	43.83	141344	56.17
2011/12	271577	113785	41.90	157792	58.10
2012/13	368805	173418	47.02	195387	52.98
2013/14	560915	255234	45.50	305681	54.50
2014/15	599668	360506	60.12	239162	39.88
2015/16	595031	318503	53.53	275877	46.36
2016/17	844297	382485	45.30	461812	54.70
2017/18	567853	296704	52.25	271149	47.75
2018/19	143840	70578	49.1	73175	50.9

Source: Public Service Commission, 2018

That is a remarkably beneficial change in Nepal's public service. The proportion of female candidates is rising as a result of female candidates' growing interest in and confidence in taking Public Service Commission exams (PSC). Although the number of female applicants has increased, there is still insufficient justification for satisfaction because the majority of candidates clearing the PSC tests are still male. The main cause of it can be the systemic discrimination that women have faced in our culture. The following section goes into additional detail about it.

Thirty-six percent of the total medical doctors in the country are females. The number of female doctors is 8, 626 across the country. Out of 7,718 applicants recommended, 2,465 were women. The Nepalese civil service has seen its proportion of women rises from 8 percent a decade ago to 23% last year, new figures reveal though clear evidence of gender discrimination remains. In 2008/9, just 32,457 women applied for civil service jobs through the national examination system, but in 2017/18 that figure reached 2,96,704 (PSC 2018). Women now comprise 20,334 of the 87,753-strong workforce.

5. Research Methodology and Data

The Central Bureau of Statistics (CBS, 2002a; 2002b; 2004) and the Public Commission Service (PCS), which offered secondary data, served as the study's main data sources. A thorough assessment of the literature on gender-related issues in various industries was taken into account. Secondary data at the national level was gathered from evaluations, reports, and websites of pertinent ministries. SPSS version 20 and R-programming are used to apply and analyze both descriptive and inferential statistics.

The numbers of civil service employees are 16,939 are recommended from inclusive advertisement but in the same period, 24,129 employees are from open competition as under table.

Table 5: Woman Applicants in Civil Service by Class and Level of Last 3 Years

Level	2016/17	2017/18	2018/19
	Women %	Women %	Women %
First Class (Gazetted)	12.7	15.8	29.8
Second Class (Gazetted)	22.4	21.4	30.8
Third Class (Gazetted)	37.8	41	42.3
First Class Non-Gazetted	43.8	47.2	49.8
Second Class Non-Gazetted	51.2	50	50

Source: Annual Reports of Public Service Commission, 2018/19

6. Results and Findings

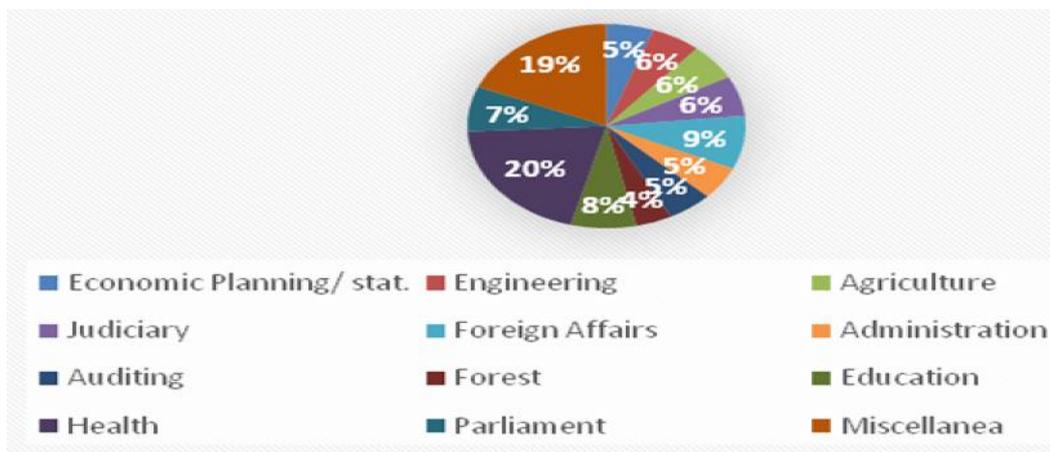Fiscal year 2067/68 to 2074/75, from inclusive civil service employees 16939 and from open competition 24129.

Figure 2: Women representation in civil service

Table 6: Gender Gap Index

Country	Global Gender Gap Index		Economic participation & opportunity	Labour Force participation	Wage equality for similar work	Estimated income (USD, PPP)	Professional & technical workers
	Rank	Score	f/m ratio	f/m ratio	f/m ratio	f/m ratio	f/m ratio
Bangladesh	47	0.719	0.465	0.54	0.57	0.50	0.41
Bhutan	124	0.638	0.622	0.80	0.79	0.57	0.49
India	108	0.669	0.376	0.35	0.62	0.23	0.34
Nepal	111	0.664	0.599	0.94	0.58	0.58	0.42
Maldives	106	0.669	0.641	0.73		0.69	1.09
Pakistan	143	0.546	0.309	0.30	0.55	0.19	0.28
Sri Lanka	109	0.669	0.521	0.42	0.63	0.35	0.97

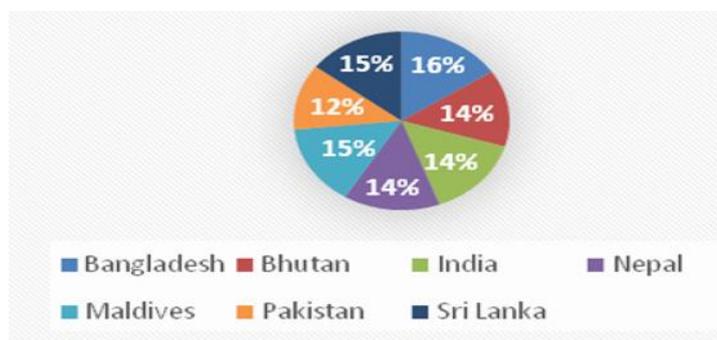*Source: The Global Gap report, 2016, World Economic Forum*

Figure 3: Global gender gap score

Table 7: Number of Candidates Recommended as Per Free-Competition and Reservation Policy

Fiscal Year	Candidates from Inclusive						Total
	Women	AJ*	Madhesi	Dalit	Disabled	Backward Area	
2019/18	1088	858	711	292	163	132	3244
2018/17	1383	1026	901	385	189	142	4026
2017/16	797	629	503	213	101	95	2338
2016/15	639	547	454	168	95	76	1979
2015/14	626	509	384	173	91	71	1854
2014/13	372	318	254	106	51	35	1136
2013/12	352	280	212	99	40	30	1013
2012/11	471	371	300	105	59	43	1349
Total	**5728**	**4538**	**3719**	**1541**	**789**	**624**	**16939**

*Source: PSC 59th report 2018,*AJ-Adibasi/janjati*

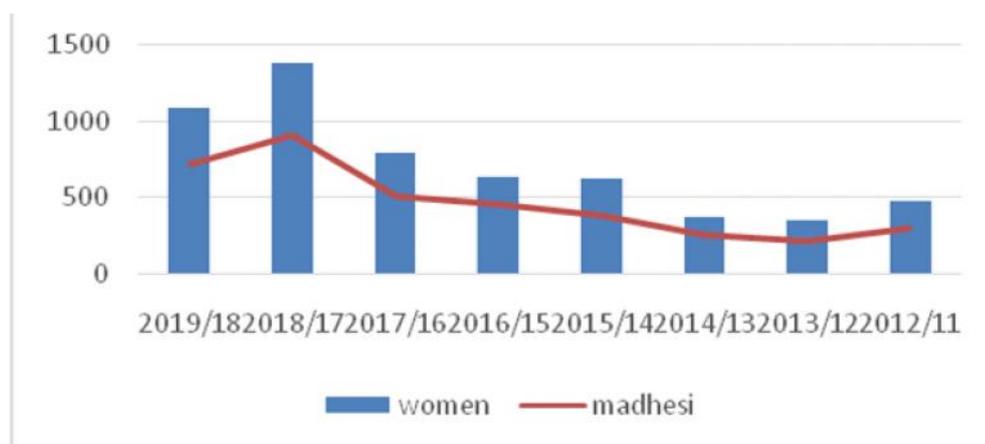**Figure 4: Trend analysis inclusiveness women vs madhesi in civil service**

Table 8: ANOVA results (Candidates from Inclusive)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2962342.994	5	592468.599	22.992	.000
Within Groups	927678.625	36	25768.851		
Total	3890021.619	41			

Since the significant value is less than zero, so there is a significant difference between women and other service employees in civil service.

7. Conclusion

The epitome of gender justice is the representation of women in the civil service. At all levels of administration, there are now more women working in the civil service of Nepal than ever before. According to Nepal's reservation policy, women now make up 24 percent of the civil service, up from 8 percent between 2008 and 2018. Although more women are working in the civil service, their representation at the policy and decision-making levels is still quite low (5.10 percent in first class and none in special class).

At the level of II and III class officers, the ratio is approximately 4.88 and 9.80%, respectively. One method for increasing the involvement of underrepresented populations and groups in public services has been regarded as a reservation. Special laws and initiatives are desperately needed to ensure that women have equal access to opportunities and rights in governmental structures. Political parties play significant roles in government and policymaking. Thus, it is strategically important for women to be properly represented in political parties and important positions. According to this, education is essential for developing sufficient strategies for achieving equality in education and women's economic empowerment. It also serves as a preparation for political and social life. As media, communication, and technology have advanced, women have begun to engage in activities outside of the house.

Programs for capacity development are necessary to boost their competitiveness and empower women. To reduce discrimination, assure equality, and reform society, it is crucial to strengthen our legal system as well as our social and political structures. Since the number of female applicants appears to be rising, reservation rules have been successful in drawing them to the civil service.

References

CBS (20021a). *Population Census Results in Gender Perspective (Population Census 2001)*, Vol. I. Kathmandu: Central Bureau of Statistics.

CBS (2002b). *Population Census Results in Gender Perspective (Population Census 2001)*, Vol. II. Kathmandu: Central Bureau of Statistics.

CBS. (2004). *Women in Nepal: Some Statistical Facts*. Kathmandu: Central Bureau of Statistics.

Frazee, C. (2003). *Thumbs up! Inclusion, rights and equality as experienced by youth with disabilities.* Toronto, Canada: The Laidlaw Foundation.

Freiler, C. (2003). *Foreword: The Laidlaw Foundation's perspective. In C. Frazee (Ed.), Thumbs up! Inclusion, rights and equality as experienced by youth with disabilities* (pp. vii-x). Torronto, Canada: Laidlaw Foundation.

Jackson, C. (1999). Social exclusion and gender: Does one size fit all? *The European Journal of Development Research, 11*(1), 125-146.

Kingsley, D. (1944). *Representative Bureaucracy*, Antioch Press, Yellow Springs.

Ministry of Law and Justice (MLJ) (2007). *The interim constitution of Nepal 2007*. Kathmandu: Ministry of Law and Justice.

Ministry of Law, Justice and Parliamentary Affairs (MLJPA) (2015). *The constitution of Nepal 2015*. Kathmandu: Ministry of Law, Justice and Parliamentary Affairs.

Public Service Commission. (2018). *Public service commission's fifty-nine annual report*. Kathmandu: Public Service Commission.

Roch, C. H., & Pitts, D. W. (2011). Differing effects of representative bureaucracy in charter schools and traditional public schools. *The American Review of Public Administration, 42*(3), 282-302.

World Bank (2013). *Inclusion Matters: The Foundation for Shared Prosperity*. Available at: https://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0010-8.

World Bank and DFID, (2006). *Unequal Citizens: Gender, Caste, and Ethnic Inclusion in Nepal. The Gender, and Social Exclusion Assessment (GSEA) report*. Available at: https://documents1.worldbank.org/curated/en/745031468324021366/pdf/379660v20WP0Un00Box0361508B0PUBLIC0.pdf

World Economic Forum (2016). *The Global Gap report, 2016*. Geneva, Switzerland: World Economic Forum.

Exploring Tourist Satisfaction: A Study of Domestic Visitors at Shivapuri Nagarjun National Park

Laxmi Kanta Sharma
Centre for Economic Development and Administration (CEDA), Tribhuvan University, Kirtipur
Email: laxmikantas@gmail.com

Abstract

This study presents a comprehensive analysis of the tourist satisfaction and market competition environment of Shivapuri National Park as a tourist destination. The study defines the relevant concepts related to tourist destinations and satisfaction and conducts a SWOT analysis to evaluate the internal and external factors affecting the park. To gather empirical data, an email questionnaire survey was conducted, and responses from 210 domestic tourists were collected to investigate the actual conditions of the park and satisfaction levels based on 18 indicators. The research identifies practical issues that hinder the improvement of tourist satisfaction and proposes measures to enhance the overall experience of tourists. The findings of the study provide valuable insights into park management, which can be used to develop effective strategies for attracting more tourists and improving their overall satisfaction levels. The research highlights the importance of understanding the tourist satisfaction and market competition environment of national parks and the need for regular monitoring and evaluation to ensure sustainable tourism development.

Keywords: Tourist destination, Tourist satisfaction, Shivapuri Nagarjun National Park

1. Introduction

As the demand for diversified material and spiritual life continues to increase, the tourism industry has experienced rapid development in recent years. Forest tourism has become an extended and expanded branch of traditional tourism, and forest parks have become the main body of this type of tourism. Shivapuri Nagarjun National Park, with its abundant natural resources and diverse flora and fauna, is an important forest park in Nepal.

In order to meet the growing demand for tourism and enhance the quality of the park as a tourist destination, it is important to improve tourist satisfaction. The satisfaction of tourists is directly related to the reputation of the scenic spot, the number of tourists, and the economic benefits of tourism. Thus, it is necessary to investigate the level of tourist satisfaction and take targeted improvement measures to address areas where tourist satisfaction needs improvement.

By analyzing the current status of tourist satisfaction in Shivapuri National Park based on empirical investigation, applicable improvement measures can be proposed to improve tourist satisfaction and promote the green, healthy, and sustainable development of the park. Improving tourist satisfaction can generate positive marketing effects, increase the intangible wealth of tourism, expand the scale of tourists, enhance the profitability of the park, and ultimately promote the economic benefits of tourism.

To achieve this, it is important to optimize the service and management quality of the park, timely understand tourist satisfaction and dissatisfaction enhance the perception of natural tourists, and improve the market competitiveness of

the park. By doing so, the tourist loyalty of Shivapuri National Park can be enhanced, leading to positive word-of-mouth advertising and practical significance for the promotion of the economic benefits of tourism.

2. Tourist Destination and Tourist Satisfaction

A tourist destination is not just a single travel attraction, but a whole area that includes various elements such as food, accommodation, transportation, and activities. Scholars have proposed different models to define tourist destinations, but they all agree that it is a complex system that includes tourism resources, location, management, image, price, service facilities, sustainable development, and the experience of tourists. However, some models may overlook factors such as price differences and the perspectives of locals. The destination composition system proposed by (Shen et al., 2018) includes tourism facilities, tourist attractions, and tourism services, with attractions being artificially developed based on tourism resources and including landscape systems and events. Overall, a tourist destination is a comprehensive system that covers all elements related to tourism.

In the late 1990s, scholars began applying tourist satisfaction to the tourism industry, which helped the industry grow. Domestic research on tourist satisfaction focused on defining what it is and creating evaluation criteria. Tourist satisfaction is a way to measure how satisfied tourists are with the products they experience during their trip. It includes both overall satisfaction and individual satisfaction and is measured using various specific indicators. Tourist satisfaction is complex, multi-dimensional, dynamic, and difficult to measure because many factors affect it. Tourists' expectations of the destination and other elements impact future satisfaction, and since expectations differ, satisfaction levels can vary. Tourist satisfaction can also change with time and location.

Various tools can be used to measure tourist satisfaction, including surveys, comment cards, online reviews, social media monitoring, mystery shopping, and focus groups. Among these, surveys are a common and effective tool used to gather information about tourists' satisfaction levels with different aspects of their trip. Surveys can be conducted in various formats, such as paper or online, and can cover different areas like accommodation, attractions, transportation, and customer service. Survey data can help businesses and destinations to identify areas of strengths and weaknesses in their services and facilities, improve customer experiences, and ultimately enhance tourist satisfaction levels. Therefore, conducting surveys can be an essential part of any comprehensive tourist satisfaction measurement program.

Surveys are an essential component in measuring tourist satisfaction at national parks, since they can reveal important information about how tourists view the area and how satisfied they are overall. Numerous subjects, including the standard of the park's facilities, the friendliness and helpfulness of the employees, the range of activities offered, the park's natural beauty, and the overall tourist experience, can be covered in surveys.

Tourist satisfaction with park-based tourism services and recreation quality is a critical concern for national park administrations and regional tourism (Eagles & McCool, 2002), as it has a significant impact on local economic development and sustainable area management (Rivera & Croes, 2010). Achieving high visitor satisfaction is a primary goal for nature-based tourist destinations (Moore, Rodger, & Taplin, 2015). To develop or assess tourism destinations, Dickman (1997) proposed the five As of tourism: attraction, activity, accommodation, access, and amenity. Several studies have investigated visitors' satisfaction with specific national park tourism services, including studies by Sivalio lu and Berköz (2012), Taylor and Grandjean (2009), Burns, Graefe, and Absher (2003), and Burns and Graefe (2006). These studies suggest that visitors typically have a satisfactory experience with the national park's ecosystem services, particularly with the natural environment and scenery, including forests.

According to the expectancy disconfirmation paradigm (Oliver, 1999), positive disconfirmation can encourage destination loyalty, leading to repeat visitation and positive word-of-mouth recommendations. On the other hand, dissatisfaction may result in visitors expressing negative word-of-mouth and seeking recreation elsewhere (Lovelock, Patterson, & Walker, 2001). Measuring visitor loyalty, which refers to a commitment to a particular destination, place, or brand (Rivera & Croes, 2010), is crucial as it indicates support for protected areas. Several studies have analyzed the relationship between park loyalty and satisfaction, including studies by Moore, Rodger, and Taplin (2017). However, while both concepts appear to be positively related, little research has examined the relationship between visitor loyalty and park affinity. Notably, Arnberger et al. (2019) found no significant relationship between the likelihood of revisiting a park and park affinity, indicating that this area warrants further investigation.

3. Progress in the Development of Shivapuri National Park

Shivapuri Nagarjun National Park, located in the northern region of Kathmandu Valley, is a visually stunning protected area. Its establishment in 2002 conferred upon it the status of the ninth national park in Nepal, with a coverage area of 159 sq km. As documented by SNNP (2017), the park provides habitat for 177 avian species, 102 butterfly taxa, 129 mushroom varieties, and 30 mammalian taxa. The park boasts several forest types, including pine, oak, and rhododendron, which endows nature enthusiasts with an exceptional experience. The park's diverse wildlife, including Himalayan black bears, leopards, and rhesus monkeys, further augments its allure. Additionally, Shivapuri National Park's pivotal role in supplying potable water to the Kathmandu Valley accentuates its importance.

Moreover, the park offers breathtaking panoramic vistas of the Himalayas and Kathmandu Valley, making it an idyllic destination to relax amidst nature, away from the city's chaos. The park's strategic location and easy accessibility make it a popular tourist spot. Shivapuri Nagarjun National Park is a stunning and protected area with diverse natural features, wildlife, and cultural sites, making it a must-visit destination for anyone who desires to witness the best of Nepal's natural beauty.

The major attractions of the park are, Bagdwar, Bishnudwar, Nagigumba, Shivapuri Peak, and Sundarijal. The mean yearly visitor count for the five years leading up to 2016 was 167,500. In the year 2016-17, the park received a total of 16,539 foreign visitors and 193,178 domestic tourists (SNNP, 2017). However, the number of foreign visitors experienced a significant decline in the following years, with 16813 and 12496 visitors in 2017 and 2018 respectively, according to the Nepal Tourism Statistics (2018). It should be noted that the COVID-19 pandemic has had a significant impact on tourist arrivals in national parks and other travel destinations, and the numbers may have decreased since the time of reporting. The park generates revenue through entrance fees, which are used for conservation and maintenance efforts.

To further develop tourism in the park, the government of Nepal has taken several measures, including the construction of trekking trails, rest houses, and other tourism infrastructure. The park also collaborates with local communities to promote eco-tourism and sustainable development. As of now, Shivapuri Nagarjun National Park is still in its early stages of tourism development, with ample opportunities for growth and expansion in the future.

4. Objectives of the Study

The general objective of the research is to investigate the level of tourist satisfaction in the Shivapuri National Park and the specific objectives are:

a. **To investigate the impact of service quality on tourist satisfaction**

    This objective aims to explore how service quality affects tourists' satisfaction levels in a tourist destination. The research can involve surveying tourists to understand their expectations of service quality and how well the destination is meeting those expectations. This can help to identify areas where service quality can be improved to enhance tourist satisfaction levels.

b. **To assess the effectiveness of traffic management and infrastructure construction on tourist satisfaction**

    This objective focuses on understanding how traffic management and infrastructure construction can impact tourist satisfaction levels. The research can involve examining the current traffic management and infrastructure in the tourist destination and surveying tourists to understand their satisfaction levels. The findings can help to identify areas where improvements can be made to enhance tourist satisfaction levels.

c. **To explore the impact of tourist commodities on tourist satisfaction**

    This objective aims to investigate how tourist commodities can affect tourist satisfaction levels. The research can involve examining the current tourist commodities in the destination and surveying tourists to understand their satisfaction levels. The findings can help to identify areas where improvements can be made to enhance tourist satisfaction levels through enriching tourist commodities.

d. **To evaluate the effectiveness of marketing and promotion on tourist satisfaction**

    This objective focuses on understanding how marketing and promotion can impact tourist satisfaction levels. The research can involve examining the current marketing and promotion strategies used at the destination and

surveying tourists to understand their awareness and perception of the destination. The findings can help to identify areas where improvements can be made to enhance tourist satisfaction levels through effective marketing and promotion strategies.

5. Research Methodology

The goal of the study was to measure tourist satisfaction with Shivapuri National Park, and the research methodology employed to achieve this goal involved several steps. The first step was data collection, which was carried out by obtaining prior written consent from respondents using their contact phone and email details from the recent visitor list of the park. The survey questionnaire in the word format was sent to the respondents via email. In the month of December 2018, a total of 550 tourists visited the park. The sample size was determined using the Yamane formula, where sample size(n) = N / {1 + N(e)^2}, where n is the required sample size, N is the population size, and e is the margin of error set at 5% (0.05).The sample size was calculated as 550 /{1 + 550(0.05)^2} = 550/(1+1.375) = 550/2.375 = 231.

The questionnaire was designed to measure various indicators of tourist satisfaction, and the respondents were asked to rate their level of satisfaction with 18 indicators on a five-point Likert scale, ranging from 1(very dissatisfied) to 5(very satisfied). The survey was conducted over a period of 30 days, from December 1, 2018, to December 31, 2018. The 231 respondents were selected using a lottery system based on their serial numbers in the visitors' list. A total of 231 filled- up questionnaires were collected via email, of which 21 copies were found invalid. Therefore, a total of 210 completed questionnaires were utilized, resulting in an effective response rate of 90.90 percent, which is considered a high rate of completion. The collected data was analyzed using SPSS Version 26 to obtain the average score, standard deviation, and ranking. Moreover, a SWOT analysis was also conducted to find the present status of the park and to cross-validate the result.

Based on the data analysis, the study provided recommendations for improving tourist satisfaction with Shivapuri National Park. These recommendations were based on the identified patterns and relationships in the data and were designed to address any areas where tourist satisfaction was found to be lacking.

6. Data Analysis and Results

6.1 SWOT Analysis of the Shivapuri National Park

Shivapuri Nagarjun National Park is conveniently located near Kathmandu, the capital city of Nepal, making it easily accessible for tourists from both domestic and international locations. This national park boasts a diverse range of flora and fauna, with over 300 species of birds, which makes it a popular spot for birdwatching enthusiasts. The park also features numerous sacred sites of significance to both Hindu and Buddhist pilgrims and religious tourists, such as the Shivapuri Baba Ashram and the Nagarjun Palace. For adventure seekers, the park offers several trekking routes, including the one to the Shivapuri peak, where trekkers can enjoy breathtaking panoramic views of the surrounding mountains and Kathmandu city. Managed by the government of Nepal, the park has a dedicated team of park rangers who work tirelessly to protect its natural and cultural heritage.

However, the park also has certain weaknesses that need to be addressed. The Shivapuri Nagarjun National Park is facing several challenges that require immediate attention to ensure the preservation of its natural and cultural heritage. The park has been affected by illegal activities such as logging and poaching, which pose a significant threat to its diverse range of flora and fauna.

In addition, the park suffers from inadequate infrastructure, including poorly maintained trails, a lack of proper signage, and limited visitor facilities. This lack of resources and funding has resulted in a decline in the quality of services offered to visitors. Moreover, the park's proximity to the city of Kathmandu has led to encroachment and illegal settlements within its boundaries, which can negatively impact its ecological and cultural significance.

The Shivapuri Nagarjun National Park faces both challenges and opportunities for sustainable development and conservation. While the park's unique ranges of flora and fauna, as well as its religious and cultural significance, have the potential to attract more tourists, there are several threats to its preservation.

Illegal logging and poaching pose a significant threat to the park's biodiversity and wildlife. The park's proximity to the city of Kathmandu has resulted in encroachment and illegal settlements within its boundaries, which poses a threat to its ecological and cultural values. The park's vulnerability to natural disasters such as landslides and floods can cause severe damage to its infrastructure and pose a threat to visitors' safety. Moreover, the park suffers from inadequate infrastructure, such as poorly maintained trails, lack of proper signage, and limited facilities for visitors. The park lacks sufficient funds and resources to manage and maintain its infrastructure, leading to a decline in the quality of services offered to visitors. However, collaborations with local communities and stakeholders can enhance the park's conservation efforts and promote sustainable development. This partnership can create employment opportunities and promote the use of sustainable practices in the park's management.

Overall, addressing the park's challenges while leveraging its opportunities can promote its sustainable development, preserve its natural and cultural heritage, and contribute to the local economy. The park can seek support from international organizations and donors to secure funding for infrastructure development and conservation projects. It can also invest in technology and innovation to enhance its tourism offerings and develop community-based tourism initiatives to generate income and promote conservation efforts.

Furthermore, the erosion of traditional knowledge and practices threatens the park's cultural and religious significance. The park also faces competition from other popular trekking destinations in Nepal, such as the Everest and Annapurna regions, which can impact its tourist flow. Moreover, political instability and security concerns in Nepal can deter visitors, negatively affecting the park's tourism industry.

To overcome these threats, the park can adopt sustainable practices, such as eco-friendly infrastructure development and waste management to mitigate climate change and pollution. It can also engage with local communities to preserve and promote traditional knowledge and practices. Additionally, the park can differentiate itself from other destinations by promoting its unique cultural and religious significance and developing new tourism products and experiences. Furthermore, the park can work with the government to improve security measures and address security concerns to ensure visitors' safety. By addressing these challenges proactively, the park can safeguard its natural and cultural heritage and sustain its tourism industry.

6.2 Analysis of the Demographic Structure of the Respondents

Based on the age distribution of the respondents, it was observed that the majority fell within the 25-35 age range, accounting for 40 percent of the total, followed by tourists aged 19-25, accounting for 20 percent. These two groups were financially independent and relatively energetic. The proportion of female and male visitors surveyed was balanced, with 48 percent being female and 52 percent being male.

In terms of occupation, most of the respondents were working-class people, accounting for 28 percent, followed by students, accounting for 20 percent. With regard to educational background, the majority of the respondents had college or above education, accounting for 70 percent. In terms of income, the majority of respondents earned between 25000-40000 Rupees and 40000-55000 Rupees a month, accounting for 36 percent and 32 percent, respectively.

Regarding experience, 75.25 percent of tourists visited the park for the first time, 10.5 percent visited a second time, and 14.25 percent had visited at least three times. Therefore, it can be concluded that this sample group was representative, and their satisfaction was of great importance for the development of the park.

6.3 Analysis of the Satisfaction of Tourists on Various Indicators of Travel Experience

Based on the data collected from the respondents' comments on satisfaction with various elements of the construction of the park, this research gives statistics and sequencing on tourists' satisfaction with various elements of the travel experience. Respondents are asked to score various indicators of the tourist destination according to their level of satisfaction. Wherein, 1' represents "very dissatisfied", 2' represents "dissatisfied", 3' represents "common", 4' represents "satisfied", 5' represents "very satisfied"; the results are shown in "Table 1".

Table 1: Satisfaction of Tourists on Various Indicators of Travel Experience

Index	Average	Standard deviation	Rank
Overall Satisfaction in general	3.79	0.85	3
External visitor	3.66	0.86	4
Internal visitor	3.22	1.15	14
Signage clarity	3.36	0.76	10
Preventive measures for safety	3.67	1.14	3
Overall cleanliness	3.42	1.18	8
Density of visitors	5.69	0.96	1
Geographic characteristics	4.12	1.08	2
Customer service approach	3.56	1.21	7
Tourism support services	3.64	0.85	5
Competency of staff	3.23	1.22	13
Staff performance	3.36	1.02	11
Restroom density	3.42	1.22	9
Route navigation	3.26	1.02	12
Visitor information services	3.12	0.75	16
Commodity pricing	3.62	0.99	6
Product components	3.21	1.21	15
Product classifications	3.12	1.05	17

Table 1 provides a summary of the results of a survey that was conducted to assess different aspects of the visitor experience in a particular location. The categories include various factors that can influence visitor satisfaction, such as overall satisfaction, external visitor experience, internal visitor experience, signage clarity, safety measures, cleanliness, the density of visitors, geographic characteristics, customer service approach, tourism support services, staff competency, staff performance, restroom density, route navigation, visitor information services, commodity pricing, product components, and product classification.

The results show that the density of visitors category has the highest average score and is ranked first, indicating that visitors feel comfortable with the number of people in the location. The geographic characteristics category has the second-highest score and is ranked second, suggesting that visitors appreciate the location's physical features, such as natural beauty or unique landmarks. The preventive measures for safety category are also highly rated and are ranked third, implying that visitors feel secure and protected while in the location.

On the other hand, the visitor information services, product components, and product classifications categories have the lowest scores and are ranked at the bottom, suggesting that visitors may have concerns about the quality and availability of information and products in the location.

Overall, the results of the survey suggest that the location is doing well in some areas but may need to focus on improving other aspects of the visitor experience to enhance visitor satisfaction and increase the likelihood of repeat visits. By analyzing the results of the survey, the location can identify areas that require attention and take appropriate measures to improve the visitor experience.

For instance, the low scores in the visitor information services category indicate that the location needs to provide more and better information to visitors about the attractions, events, and services available in the area. This can be

achieved by providing brochures, maps, and other printed materials, as well as online resources such as a website or mobile app.

Similarly, the low scores in the product components and product classification categories suggest that the location needs to review and enhance the range and quality of products and services available to visitors. This can be achieved by partnering with local businesses and vendors to provide high-quality and diverse products that cater to the needs and interests of different types of visitors.

The results also show that the internal visitor experience category has a relatively low score, indicating that there may be room for improvement in the facilities and services provided to internal visitors, such as staff members, volunteers, and contractors. By addressing this issue, the location can create a more welcoming and inclusive environment for all visitors, which can enhance their overall satisfaction and loyalty.

In conclusion, the results of the survey highlight the strengths and weaknesses of the visitor experience in the location and provide valuable insights into the areas that require attention and improvement. By taking proactive measures to enhance the visitor experience, the location can attract and retain more visitors, increase revenue and contribute to the local economy.

6.4 Counter Measures for Improving the Tourist Satisfaction in Shivapuri Nagarjun National Park

Enhancing the Service Quality in the Scenic Area

It includes the following aspects:

- **Providing special training for service personnel:** Regular training sessions should be conducted for workers in scenic areas to improve their appearance, service etiquette, and security response capabilities. Drills and practices should also be regularly carried out to enhance their ability to respond to emergencies.

- **Adding guide interpreters:** To enrich tourists' knowledge about Shivapuri's history and culture, guide interpreters should be added to provide explanations about the tourist destination's cultural resources.

Improving Internal Traffic Management and Infrastructure Construction

It includes the following aspects:

- **Introducing intelligent parking system:** The management can introduce an intelligent parking system to improve the operation efficiency of parking lots and reduce the time used for parking. An emergency warning plan should also be formulated to avoid chaos in parking lots during accidental and emergency events.

- **Strengthening taxi market management and increasing penalties:** To protect the rights and interests of tourists, management personnel should improve the reporting and complaints system and strengthen the training and management of drivers and conductors to improve operational efficiency.

- **Enhancing infrastructure construction:** The scenic area should expand the number of public toilets and signs, as well as select high-quality environment-friendly materials. While renovating the original infrastructure, it is also necessary to add new equipment, such as enhancing the construction of signal towers to increase the guarantee for tourists' safety and communication convenience.

Enriching Tourist Commodities and Enhancing the Soft Power of the Destination Culture

It includes the following aspects:

- **Developing cultural tourism commodities:** To explore the characteristics of Shivapuri's culture, the development of tourist commodities should be closely linked to the cultural resources of the tourist destination. By integrating tangible and intangible commodities, the cultural connotation of tourism commodities can be enriched.

- **Strengthening marketing and promotion:** To increase the destination's influence, innovative marketing methods should be adopted, and multiple channels and media should be used for marketing propagation. Taking

the opportunities of major events and tourism-related activities in Nepal and foreign countries can also help spread and promote the tourist destination.

7. Conclusion

Tourist satisfaction is a crucial factor that can affect a tourist destination's word of mouth and the likelihood of tourists returning to visit in the future. In this study, the tourist destination of Shivapuri Nagarjun National Park was taken as an example to investigate the level of tourist satisfaction, and measures were proposed to improve the indicators with relatively low scores in the survey of tourist satisfaction.

The first suggested measure to improve tourist satisfaction is to enhance the service quality in the scenic area. This can be accomplished by providing regular special training to improve the service personnel's service capabilities. The training should cover appearance, service etiquette, and other important areas that can cultivate the workers' normative practices and correct attitudes. Additionally, the training should focus on strengthening the emphasis on security and workers' ability to respond to emergencies. Drills and practices should be regularly carried out for emergency events.

Another measure to improve the service quality in the scenic area is to add guide interpreters in the scenic area. Shivapuri National Park is a natural tourist destination that has rich cultural connotations. During touring, it is necessary to strengthen the explanation of the tourism resources to enrich tourists' knowledge and make them available to learn about the history and culture while enjoying physical and mental pleasure.

The second set of measures focuses on improving internal traffic management and infrastructure construction. The increasing trend of self-driving tours demands that tourist destinations implement measures to enhance self-driving vehicle management and taxi market management. One suggestion is to introduce an intelligent parking system to improve the operation efficiency of the parking lot and reduce the time used for parking. Additionally, an emergency warning plan should be formulated to avoid chaos in the parking lot during accidental and emergency events.

Another measure is to enhance the management of the taxi market and increase penalties to protect the rights and interests of tourists to the greatest extent possible. Management personnel in the scenic spot should improve relevant reporting and complaints systems and strengthen the training and management of drivers and conductors to improve the operational efficiency of resources.

In addition to improving traffic management, it is also necessary to strengthen infrastructure construction. Tourists are less satisfied with the density of public toilets and the number of signage in the scenic area. Therefore, it is necessary to expand the number of toilets in the scenic area, add the number of signs, and select high-quality environment-friendly materials. While renovating the original infrastructure, it is also necessary to add some new equipment, such as enhancing the construction of signal towers to increase the guarantee of tourists' safety and communication convenience. The ticket-checking system can also be upgraded to an electronic ticket-checking system to improve the efficiency of checking tickets.

The third set of measures focuses on enriching tourist commodities and enhancing the soft power of the destination culture. The cultural connotation of tourism commodities can be enriched, and the grade of commodities can be improved by paying attention to the development of cultural resources and infusing the culture into the commodities to explore the characteristics of the commodities. Through the combination of tangible commodities and intangible commodities, the Shivapuri Nagarjun National Park can be introduced while introducing tourist commodities to the market.

Overall, the measures proposed in this study can provide a reference for the application and promotion of satisfaction research on other related tourist destinations. Tourist destinations can increase the number of visitors by enhancing tourist satisfaction.

References

Arnberger, A., Eder, R., Allex, B., Preisel, H., & Husslein, M. (2019). National park affinity segments of overnight tourists differ in satisfaction with, attitudes towards, and specialization in, national parks: Results from the Bavarian Forest National Park. *Journal of Natural Conservation, 47*, 93-102. doi: 10.1016/j.jnc.2018.11.005.

Burns, R.C., Graefe, A.R., & Absher, J.D. (2003). Alternate measurement approaches to recreational customer satisfaction: Satisfaction-only versus gap scores. *Leisure Sciences, 25*, 363-380.

Dickman, S. (1997). *Tourism: An Introductory Text* (3rd ed.). Hodder Headline.

Eagles, P.F.J. & McCool, S.F. (2002). Tourism in National Parks and Protected Areas: Planning and Management. CABI Publishing: Wallingsford, UK.

Lovelock, C.H., Patterson, P.G., & Walker, R.H. (2001). *Services Marketing: An Asia-Pacific Perspective*, 2nd ed. Pearson Education.

Ministry of Culture, Tourism & Civil Aviation. (2018). *Nepal Tourism Statistics 2018*. Retrieved from http://www.tourism.gov.np/images/uploads/documents/Tourism_Statistics_Report_2018_2.pdf

Moore, S. A., Rodger, K., & Taplin, R. (2015). Moving beyond visitor satisfaction to loyalty in nature-based tourism: A review and research agenda. *Current Issues in Tourism, 18*(7), 667-683.

Moore, S.A., Rodger, K., & Taplin, R.H. (2017). Developing a better understanding of the complexities of visitor loyalty to Karijini National Park, Western Australia. *Tourism Management, 62*, 20-28. doi: 10.1016/j.tourman.2017.03.006.

Oliver, R.L. (1999). Whence consumer loyalty? *Journal of Marketing, 63*, 33-44. doi: 10.1177/002224299906300403.

Rivera, M.A., & Croes, R. (2010). Ecotourists' loyalty: Will they tell about the destination or will they return? *Journal of Ecotourism, 9*, 85-103. doi: 10.1080/14724041003667768.

Shen, Y., Morrison, A. M., Wu, B., Park, J., Li, C., & Li, M. (2018). Where in the world? A geographic analysis of a decade of research in tourism, hospitality, and leisure journals. *Journal of Hospitality & Tourism Research, 42(2)*, 171-200.

Sivalio lu, P., & Berköz, L. (2012). User satisfaction in national parks. *Academic Research International, 2*, 537-548.

SNNP (2017). *Shivapuri Nagarjun National Park and Bufferzone Management Plan (2018-2022).* Government of Nepal, Ministry of Forest and Environment, Department of National Park and Wildlife Conservation.

Taylor, P.A., & Grandjean, B.D. (2009). Visitor satisfaction and support for park fees: Examining the effects of front country, backcountry, and information in Rocky Mountain National Park. *The George Wright Forum, 26*, 12-21.

About the Journal and Manuscript Preparation Instructions

About the Journal

The Journal of Development and Administrative Studies (JODAS) is a double-blind reviewed scholarly journal devoted to publishing high-quality papers using multidisciplinary approaches with a strong emphasis on emerging issues of business, economics, management, finance, and administration since 1978 on a semi-annual basis. Its main purpose is to disseminate ideas and research findings on various socioeconomic development issues related to Nepal and other countries. It brings out scholarly research articles and other features. It intends to serve as an outlet with strong theoretical and empirical research for an intellectual forum for the communication of ideas among social scientists in Nepal and the rest of the world.

Submission Information

Interested authors are required to submit their papers with a length not exceeding 5,000 words. The papers submitted to JODAS should not have been published or be under consideration for publication elsewhere. The editorial board reserves the complete right about accepting or rejecting the received articles. The opinion expressed in the articles are those of the authors and do not necessarily reflect the views of editors or publishers. The copyright of the accepted articles is reserved by the Centre for Economic Development and Administration (CEDA), Tribhuvan University. No part of the article published in this journal should be reproduced except as provided by the law currently in force without the written consent of the centre.

Manuscript Preparation Instructions

General Guidelines

1. All manuscripts should be submitted electronically in English language to the publication section of CEDA (Email*: info@ceda.org.np)*. The soft copy must be at least in Microsoft Office (2007 Version).
2. Allow top margins of 1.25" (3.2 cm) first page and 0.75" (1.9 cm) on the following pages, bottom margin of 1.44" (3.7 cm) left margin of 0.63" (1.6 cm) and right margin of 0.63" (1.6 cm).
3. Type single-spaced text and allow for double spacing between paragraphs.
4. The paper should include: title, author's name(s), affiliation, and present address.
5. Abstract (250 words maximum), an introduction, methodology (model, materials, and methods), findings, a conclusion, and a reference.
6. Acknowledgement and information on the grants received should be given if any.
7. Important formulae, figures, and tables should be numbered consecutively throughout the manuscript.

Fonts

1. Use font type Times New Roman.
2. Use font size 14 bold for the title.
3. Use font size 12 for the author's and affiliation names and addresses.
4. Use font size 11 for the text which includes abstract, body, references and acknowledgment.

Headings

1. Major headings should be centred in the column with the first letter capital in each word.
2. Subheadings should be set in italics, bold and aligned to the left-hand margin of the column on a separate line.

Tables and Figures

1. Use font size 10.
2. The charts and graphs must be centred and the title should be at the top.
3. Number all tables and figures with Arabic numerals in the order in which the tables are first mentioned in text.
4. Capitalise captions.

End Notes

1. Endnotes should be kept to a minimum.
2. Use single spacing and font size 10.

References

References should be complete and follow the latest APA Style. For *Examples:*

Single Author

Bresnahan, T. F. (1986). Measuring spillovers from technical advance: Mainframe computers in financial services. *American Economic Review, 76*(4), 742-755.

Two Authors

Wegener, D. T., & Petty, R. E. (1994). Mood management across affective states: The hedonic contingency hypothesis. *Journal of Personality & Social Psychology, 66*, 1034-1048.

Three to Seven Authors

Kernis, M. H., Cornell, D. P., Sun, C. R., Berry, A., Harlow, T., & Bach, J. S. (1993). There's more to self-esteem than whether it is high or low: The importance of stability of self-esteem. *Journal of Personality and Social Psychology, 65*, 1190-1204.

More Than Seven Authors

Miller, F. H., Choi, M. J., Angeli, L. L., Harland, A. A., Stamos, J. A., Thomas, S. T., . . . Rubin, L. H. (2009). Website usability for the blind and low-vision user. *Technical Communication 57*, 323-335.

Organization as Author.

American Psychological Association. (2003).

Unknown Author

Merriam-Webster's collegiate dictionary (10th ed.) (1993). Springfield, MA: Merriam-Webster.

Online document:

Author, A.A. (2009). *Title of work*. Retrieved month day, year, from source.