Changing Landscape of Science and Technology Education in Nepal

Key Note Lecture on the 2nd NRN Global Knowledge Convention "Intersection in Natural Sciences"

Dr. Giridhari Sharma Paudel
Vice-chairman
Policy and Planning Commission Gandaki Province

11 October 2020

24 Ashouj 2077

Dhulikhel Kavre, Nepal

Content of this presentation

- State of art: science and technology education in Nepal
    - Nepal unification feudal period before, 1846 AD
    - Oligarchy Rana Period, between 1947-1950 AD
    - Transitional period- between Rana and Unitary Panchyat regime, between 1951-1960 AD
    - Unitary Panchyat Period, between 1961-1989 AD
    - Multiparty democracy period, between 1990-2014 AD
    - Federal democratic republication period, 2015 onwards
- Change in students enrollment in science and technology subjects between 2003/004 and 2018/2019 in Nepalese universities
- Share of science students in secondary school enrollment
- Problem in science and technology education in Nepal
- Way forward to promote science and technology teaching and research in Nepal

Science and technology education during Nepal unification feudal period

Period	Year	Main thrust of education	Scope of science and technology education
1. Nepal Unification Feudal Period	Before 1846 AD	• Main thrust of education was to produce priests to assist in customary religious practice of people and skilled military personnel for unification of Nepal • The priests in temple, Gumba and mosque were educating people • Local priests were also educating young people in the morning and evening at their home	• No formal education system • There was no scope for science and technology education • Though teaching and learning of astrology was in practice in informal setting

Science and technology education during oligarchy Rana period

Period	Year	Main thrust of education	Scope of science and technology education
2. Oligarchy Rana Period	1846-1950 AD	• Main thrust of education system was to educate elite Rana family members to rule the country • Jang Bahadur Rana, decided to give his children an English education • In 1854 AD he called an English tutor to educate his children in palace and this act established supremacy of English education over traditional Sanskrit-based education • The Ranas kept education the exclusive prerogative of the ruling elite, the rest of the population remained largely illiterate • Rana feared with education and alienated people • In 1950 literacy rate was just 5 percent	• Formal education system was opened for elite Rana family • Durbar High School was first established in 1853 • Trichandra College was established in 1918 • Padmodaya High School was established in 1947 • General science of Indian School Curriculum was taught in Rana Centric school • British retired army personnel after world war II opened schools in community

Science and technology education during transitional period

Period	Year	Main thrust of education	Scope of science and technology education
3. Transitional period between Oligarchy Rana Regime and Unitary Panchyat System	1950-1960 AD	• Main thrust of education system was to literate people and produce administrators and technicians for development • Formal education system was opened to general public • Literacy rate grew gradually from 5 percent in 1950 to 9 percent in 1960 (Male 16.3 and female 1.8 percent)	• Efforts were made to establish an education system • The National Education Planning Commission was founded in 1954 • Many schools were opened in rural urban set up • Tribhuvan University (T.U) was established 1959 for higher education • This period opened new avenues for science and technology education in Nepal

Science and technology education during unitary Panchyat period

Period	Year	Main thrust of education	Scope of science and technology education
4. Unitary Political System (Locally called Panchayat) Period	1961-1989 AD	• Main thrust of education was to literate people, produce administrators and technicians for development and politicians to support and advocate the unitary political system. • Literacy rate increased to 40 percent (54% male and 25% female) • Total school enrollment was approximately 52 percent of school-age children (approximately 70 percent of school-age boys, 30 percent of school-age girls) in 1984.	• All Round National Education Committee was formed in 1961 • Formal education system was expanded • Constituent campus of Tribhuvan University were expanded with basic science • Nepal Sanskrit University was established in 1986 • National Education Advisory Board was formed in 1968 • New Education System was introduced in 1971 • In 1975 primary education was made free, and the government began to provide school facilities, teachers, and educational materials • As of 1987, number of secondary school increased to 1,501 and basic science was taught in these schools

Science and technology education during unitary Panchyat period

Period	Year	Main thrust of education	Scope of science and technology education
4. Unitary Political System (Locally called Panchayat) Period	1961-1989 AD	• Education remained largely urban-biased • The majority of education institutions, particularly better quality institutions, were found in urban areas • In rural areas where schools were set up, the quality of instruction was inferior, facilities were very poor, and educational materials were either difficult to find or virtually unavailable	• The number of constituent and affiliated college increased from 8 to 132 under Tribhuvan University in 1987 • Number of students enrolled in university reached 83,000 in 1987 of which 40 % were in humanities, 31% in commerce, 11% in science and technology, 6% in education and 12% in other subjects.

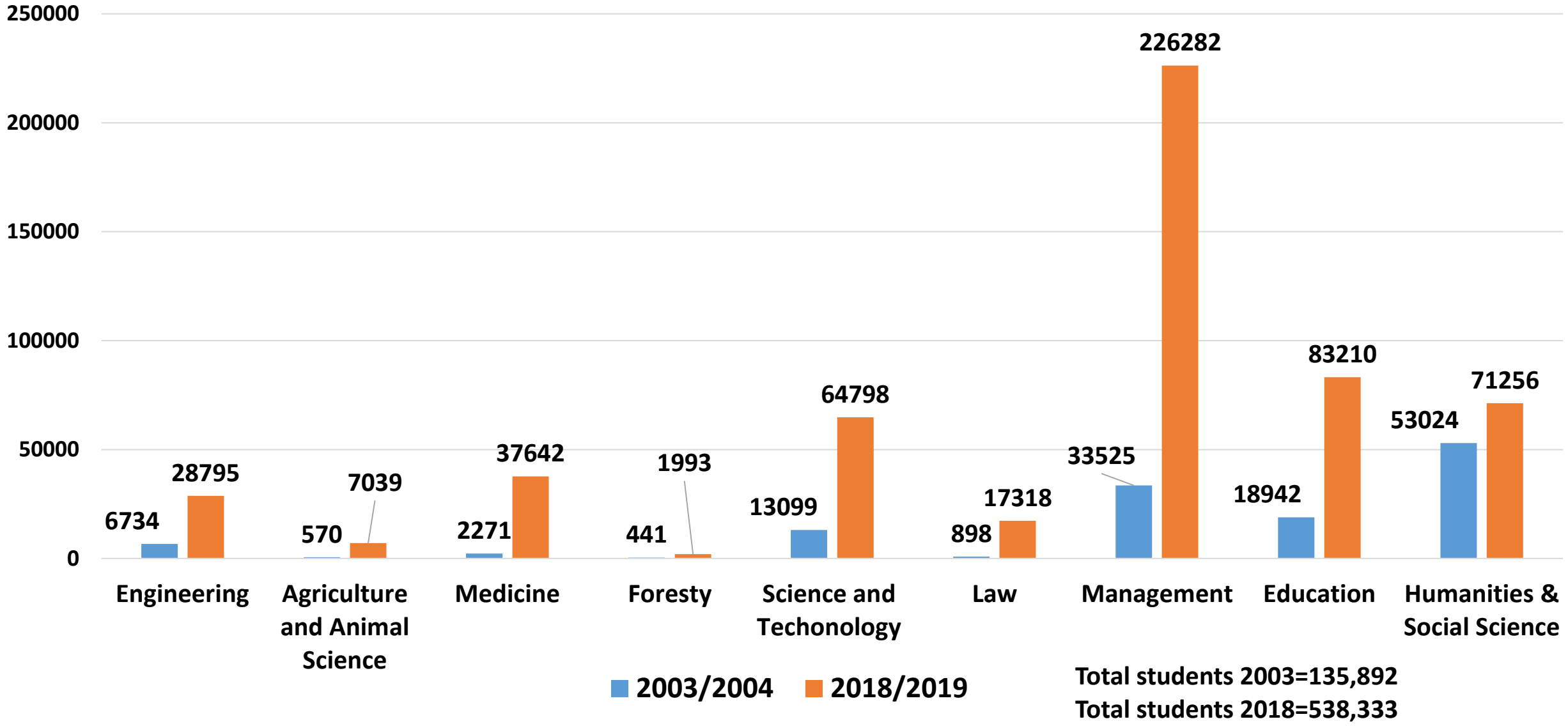
Science and technology education during multiparty democracy period

Period	Year	Main thrust of education	Scope of science and technology education
Multiparty Democracy Period	1990 - 2014 AD	• Main thrust of education system was to literate people and produce skilled human resources able to compete in national and international market. • Overwhelming majority of campus and college were teaching general subjects and graduates at large were not able to compete in the international market unless they were trained further. • Literacy rate reached 66 percent (72% male and 44% female)	• Formal education system was opened for private sector • Many new schools and universities were opened • Kathmandu University was established in 1990 • Purbanchal and Pokhara University in 1995 and 1996 respectively • Mid-western University and Far Western University in 2009 • Agriculture and Forestry University in 2010 • Lumbini Bauddha University in 2014 • Many 10+2 higher secondary schools were opened for science education and private college for science and technology education

Science and technology education during federal republican period

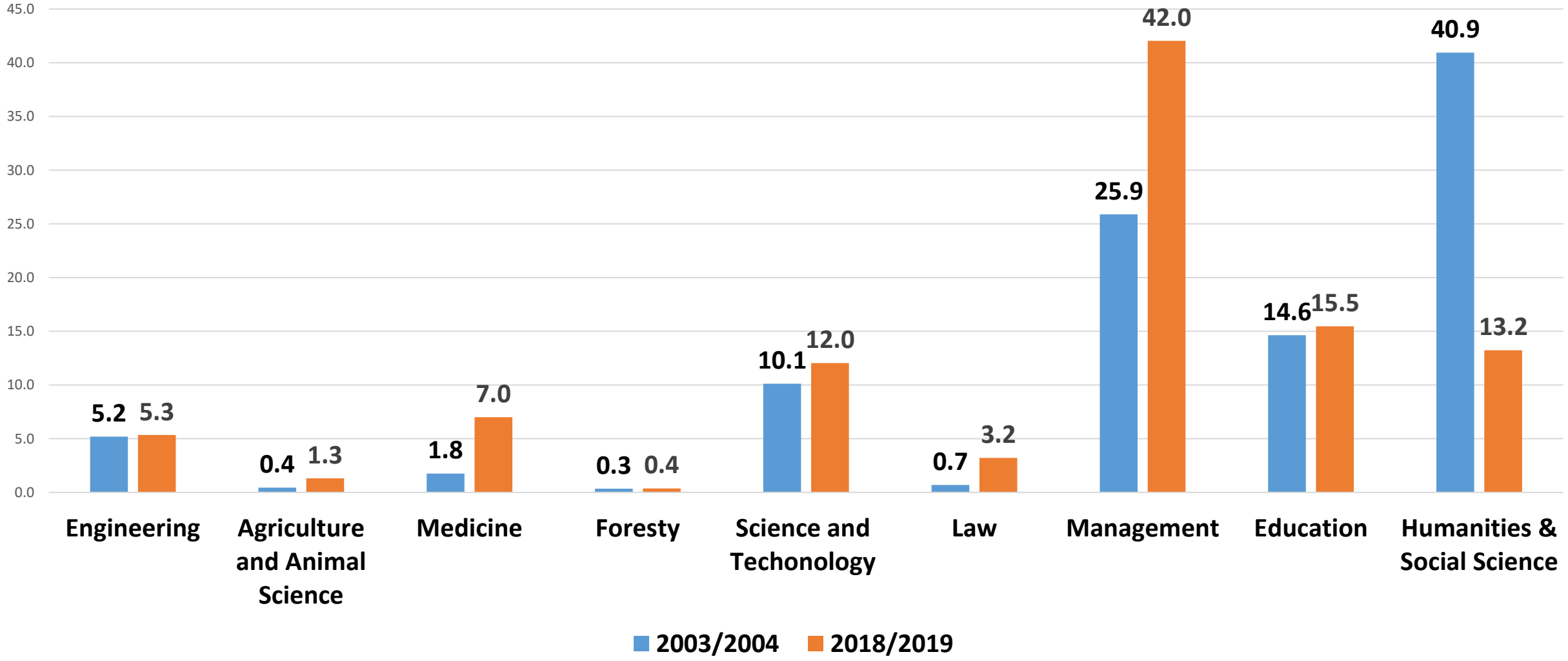
Period	Year	Main thrust of education	Scope of science and technology education
Federal Democratic Republication Period	2015 and onwards	• Main thrust of education is to produce competent graduates for prosperity of the country • A transformative shift is expected from general education to technical education • Graduate will have entrepreneur and production oriented mindset	• Formal education system is a mix of public and private sector • New university are opened like Open University in 2016, Rajshree University in 2017, Gandaki University and Yogmaya University in 2019 • Madan Bhandari Technical University and other provincial university are in pipeline • Teaching science and technology is in high priority • A balance between technical education and general education is expected • General college are expected to covert into technical subjects

Change in number of students enrollment in major subjects in universities of Nepal between 2003/2004-2018/2019

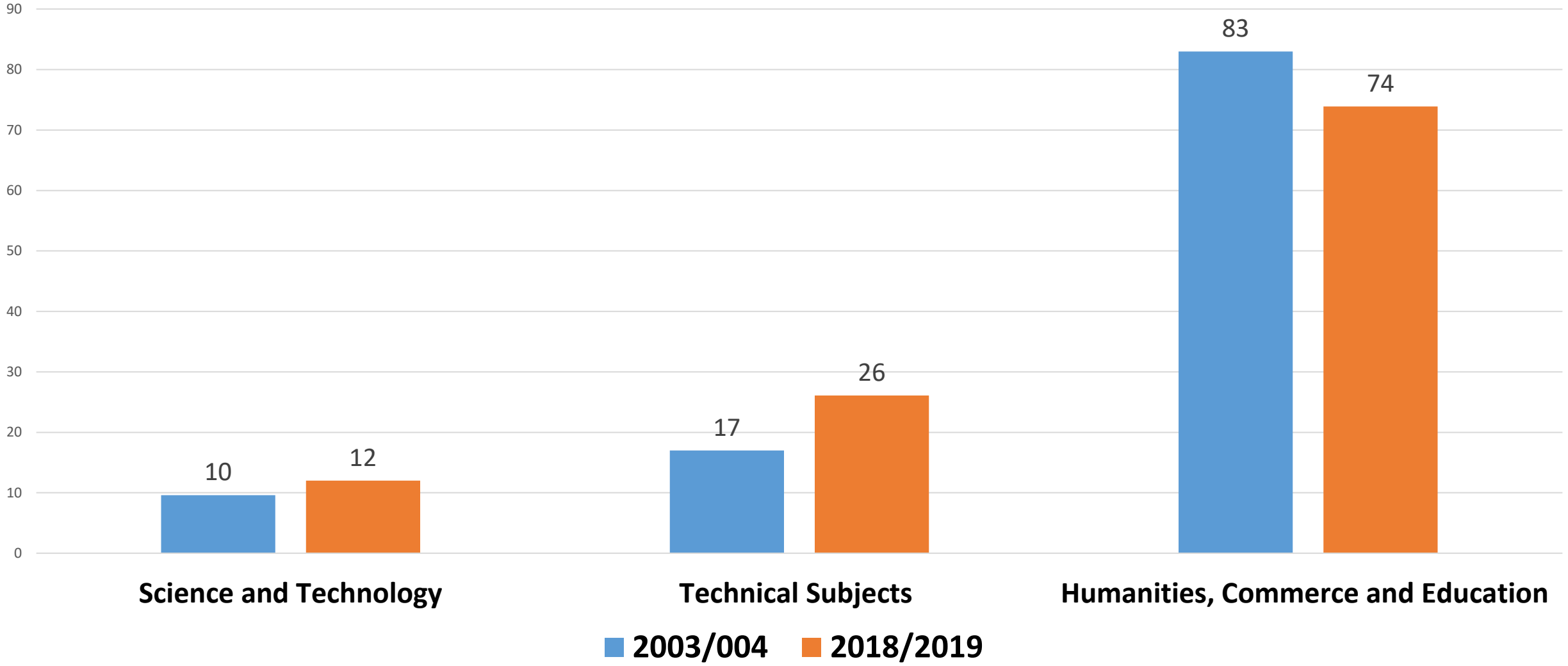


Total students 2003=135,892
Total students 2018=538,333

Change in % share of students enrollment in major subjects in the universities of Nepal between 2003/2004-2018/2019

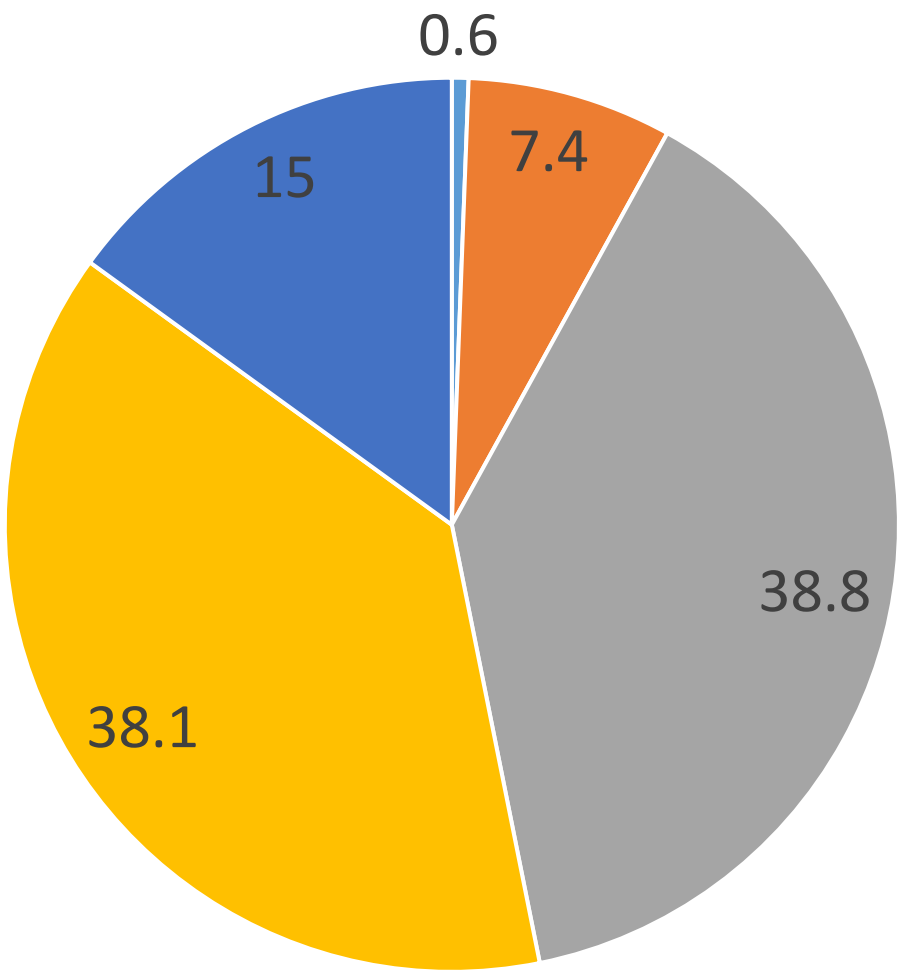


Change in % share of students enrollment in technical and non-technical subjects in university education system of Nepal between 2003/2004-2018/2019

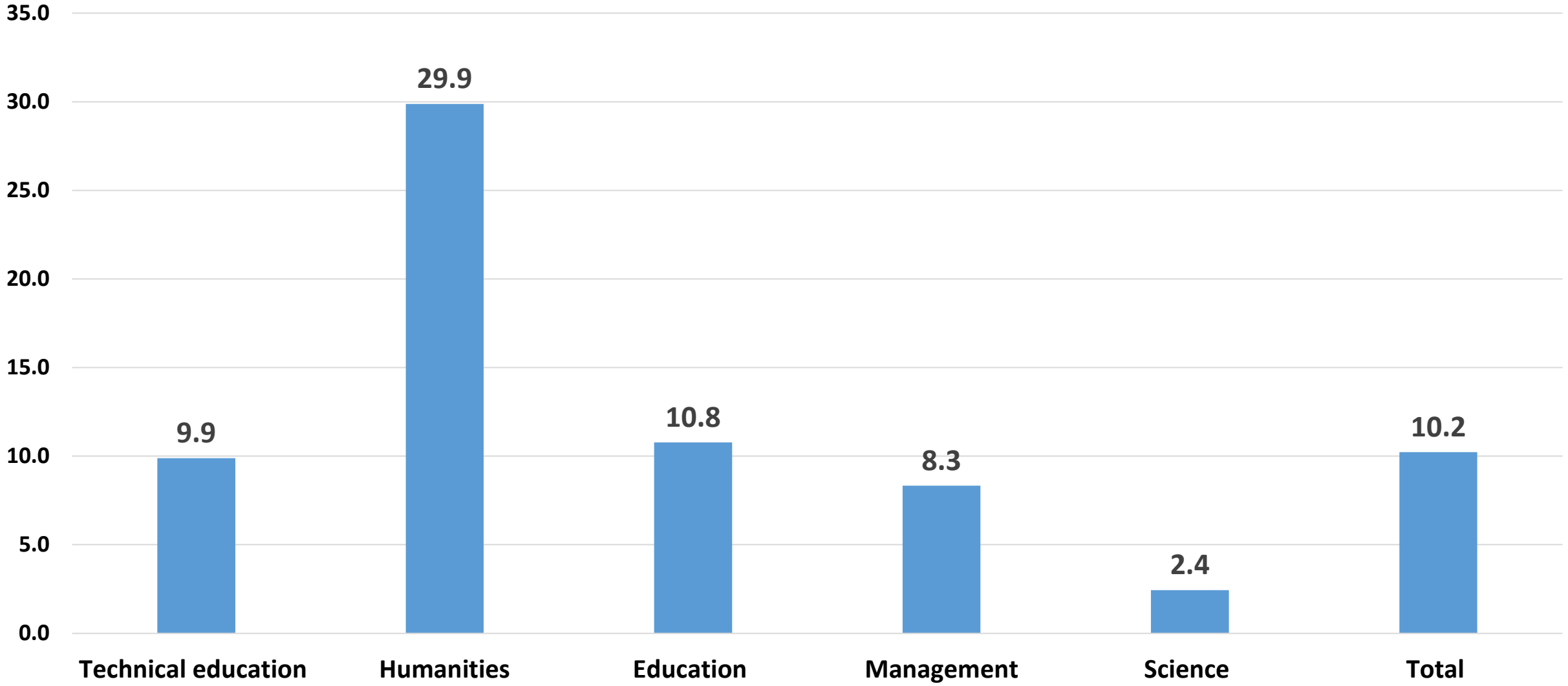


% share of students enrolled in grade 11 and 12 by subjects in 2018 in Nepal

Total students=631,536



Students dropout rate from grade 11 to 12 in 2018 in Nepal



Problem in Science and Technology Teaching in Nepal

- Poor infrastructures like class room, laboratory, library, IT connectivity etc.
- Inadequate number of trained teacher
- Inadequate number of science lab
- Poorly equipped labs (Botany, Zoology, Biology, Chemistry, Physic, Micro-biology, Molecular biology, Bio-informatics are taught in Nepal). These subjects have no equipped labs
- Very low investment in science and technology related R&D
- Poor quality of research and thesis writing
- Weak link between industry & science and technology teaching and research
- To date universities are unable to introduce new course in Nano-technology, materials science, artificial intelligence, chemical engineering etc.

Way forward to promote science and technology teaching and research in Nepal

- Encourage teacher and researcher involved in science and technology teaching and research for further study
- Increase number of trained teacher in science and technology teaching
- Increase government finance in research and development
- Establish incubation center in science and technology
- Attract young people in science and technology teaching and research
- Construct science and technology class rooms and labs with modern state of art
- Equip science lab
- Increase government finance in science and technology related infrastructures
- Strengthen science and technology teaching in secondary schools which are the source of students for university in science and technology subjects

Summary: Changing landscape of science and technology education in Nepal

SN	Period	Year	Main thrust of education	Scope of science and technology education
1	Nepal Unification Feudal Period	Before 1846 AD	Main thrust of education was to produce priests and skilled military personnel	There was no scope for science and technology teaching
2	Oligarchy Rana Period	1846- 1950 AD	Main thrust of education system was to educate elite Rana family members	General science course of Indian school was introduced for elite Rana
3	Transitional period	1950- 1960 AD	Main thrust of education system was to literate people	Science and technology education was made public
4	Unitary Political System (Panchayat Period)	1961-1989 AD	Main thrust of education system was to literate people and produce development practitioners	Science curriculum was introduced in all secondary schools and technical education was expanded beyond Kathmandu
5	Multiparty Democracy Period	1990-2014 AD	Main thrust of education was to produce skilled human resources able to compete in national and international market	Education was opened for private sector and +2 science schools and technical colleges were opened
6	Federal Democratic Republication Period	2015 Onward	Main thrust of education is to produce competent graduates to drive the country towards prosperity	Increased scope of science and technology education for industrialization of the country

Summary: Changing landscape of science and technology education in Nepal

SN	Issues	Summary
1	Change in student intake in science and technology in university	• Student enrollment in science and technology subjects in Nepalese universities increased from 10% in 2003 to 12 % in 2018. • Similarly, student enrollment in technical subjects in Nepalese universities increased from 17% in 2003 to 26 % in 2018. • Student enrollment in 10+2 schools in science is just 15% .
2	Problem in science and technology education in Nepal	Poor infrastructures, inadequate number of trained teacher and science lab, poorly equipped science labs, low investment in science and technology related R&D, poor quality research and thesis writing, weak link between industry & science and technology teaching and research.
3	Way forward	Encourage young people in science and technology teaching and research, increase number of trained teacher, government finance in R&D, construction of class room, labs, equipping labs and link science and technology research with market/industry.

Abstract

Main objective of this study is to highlight on changing landscape of science and technology education in higher secondary school and university in Nepal. Information for this study was collected from Economic Survey of Nepal, Flash Education Report and key informant interview. A transformation from general education to science and technology based education is on high demand in Nepal for achieving the ambitious national goal of prosperity by 2043. However, supply of science and technology education is creeping gradually because most of the university, college and school in Nepal were established during literacy period between 1951-2015. Main intent of universities, colleges and higher secondary schools was to produce teacher, administrator, security personnel and little attention was given for technician and entrepreneur required for industrialization and economic transformation of the country. The number of students enrolled in universities in science and technology and technical subjects increased by 201 and 508 percent respectively between 2003/2004 and 2018/2019. However, net sheer of students in science and technology in total university students increased marginally from 9.6 percent to 12 percent during this period. Similarly, the share of students in technical subjects in total university students increased from 17 to 26.1 percent during last 15-year period. The share of students enrolled in science in total students in higher secondary school (Grade 11 and 12) is just 15 percent. The national plan to transform Nepal from the least developed country to developing country by 2022, middle income country by 2030 and developed country by 2043 demand reorientation of education system and give adequate emphasis for science and technology subjects in secondary school and university. Upgradation and modernization of community secondary school, as a source of potential student supplier, is essential for increasing student in science and technology subjects in university. Refinancing to upgrade science lab, class room, teacher training and revision of curriculum is equally important.