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POLICY PAPER

Requirement of Digital Education in Different Universities in West Bengal, India

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ABSTRACT

Education is the basic need of every human being. The education shows the progress of any country. To give the education to the citizen of India, there has lots of different institution available for the students. India has many higher educational institutions to give and encourage the students to get proper education. The higher educational institutions could be Central University, State University, Private University, Deemed to be University and so on. In this chapter review of literature has discussed. Different types of Universities present in West Bengal, India have also discussed. It has graphically shown year wise comparison on the number of different types of Universities in West Bengal. It also discussed the number of Male and Female students enrolled in various higher education programs of different universities in West Bengal, India. In this chapter requirement of Digital Education in different universities in West Bengal, India has been discussed. Challenges to implement the Digital Education has also discussed in this chapter.

Keywords: Digital Education, Higher Educational Institutions, Central University, State University, Private University, Deemed to be University

The implementation of digital education has brought a revolutionary change in the field of education. Education sector has expanded with the utilization of digital education. Digital education has increased the accessibility and flexibility of education. Traditional education system has the barrier of geographic limitation, time limitation and financial constraint. Digital Education tried to overcome these problems. It provides an advance and efficient education management. Various basic Technologies and emerging Technologies have used in digital education. From data collection to data processing, from data management to data storage everything has been successfully performed by the use of Technologies. To get the maximum benefit, it is necessary to implement the digital education in different universities and institutions in India. There are different types of universities in India. The universities offer different kind of courses and programs. The mode of program also defer from university to university. The mode

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of program could be face to face on campus mode, distance learning mode, online mode, blended mode (mixture of face to face on campus mode with online mode) and so on. Every year lots of students have enrolled in different courses and program in different universities or institutions[8]. So digital education is very much useful for the betterment of the student and to give the student personalize and customized study material. It could be helpful to identify the learning difficulties of the student. It could also possible to track the student performance and helpful for the progress of the student. So it is very much necessary to implement the digital education in all kind of universities in India.

Objectives

Digital education is an important part of our modern education system. Therefore to study the requirement of Digital Education in different Educational Institution is very important. The objectives of this chapter are —

- To give the overview of Digital Education.
- To discuss the review of literature and previous works.
- To study the background of the education system of West Bengal, India
- To get data about different types of universities and the number of students enrolled in different higher education programs.
- To discuss the requirement of Digital Education in Different Universities in West Bengal, India.

Methodology used

The work entitled 'Requirement of Digital Education in Different Universities in West Bengal, India' is a theoretical chapter and it is interdisciplinary in nature. Various secondary sources are used from different areas and subjects viz. Education, e-Learning, Technologies, Different University information which are used in Digital Education are studied to complete this work. The concept of this chapter is unique in nature.

Review of Literature

Review of Literature is one of the important parts in this chapter, titled- "Requirement of Digital Education in Different Universities in West Bengal, India". In this Review of Literature it has been discussed the previous related work in this context.

Benešová, and Tupa (2017)[1] worked on requirements for Education and Qualification of People in Industry 4.0. It has shown different implementation phases of Industry 4.0. It has shown the Qualifications and the skills for Industry 4.0. It also has shown the Production job profiles for Industry 4.0. Chakrabarty *et al.* (2016)[2] surveyed in West Bengal higher secondary education to validating the course experience through questionnaire. It has designed Course Experience Questionnaire (CEQ) and collected the feedback from students. It has translated the CEQ into Bengali and collect the answer from 552 science students at 15 higher secondary schools in West Bengal, India. It has been recommended the students' perceptions of the academic quality of programmes in West Bengal, India. Jana (2017)[3] made an overview on Higher education in West Bengal. It gave the type of Universities in West Bengal, List of Universities and Number of Affiliated colleges, type wise universities in West Bengal and India, Growth of Number colleges in

West Bengal and India, 2016. It has shown the diversification and disparities in higher education in West Bengal. It also discussed the quality and employment status of Higher Education in West Bengal. Expenditure pattern has also been discussed.

Manna and Jayanta (2016)[4] made a study on Secondary teacher education system in India with special reference to West Bengal. It has discussed the various types of Secondary Teacher Education in India. It has tried to find out the organizational pattern and administrational and supervisional role of secondary teacher education in India with special reference to West Bengal. It highlighted the status of Teacher Educators of Secondary Teacher Education Institutions and the existing scenario of secondary Teacher Education Programme in India with special reference to West Bengal.

Mukherjee and Bear (2017)[5] discussed the challenges and opportunities to implement inclusive education in West Bengal. It has discussed the background of the inclusive education in Indian perspective. It has shown the status of implementation of inclusive education with Paschim Banga Sarva Siksha Mission Annual Report 2012-2013, 2014. It has been shown the Barriers and Suggestions for Implementing Inclusive Education.

Mukhopadhyay (2008)[6] made a survey on women to find the role of education in the empowerment of women in the district of Malda, West Bengal, India. It prioritized in general education of women, Problems affecting women's education, education after marriage, Source of help to complete education for married women, Education influencing the practice of dowry and so on.

Ouhbi *et al.* (2015)[7] made a systematic mapping study about the requirements of engineering education. It has tried to identify and to present the current research on Requirements engineering education (REE). Total 79 papers were selected and classified according to some criteria and discussed the results of this systematic mapping study.

Rana *et al.* (2003)[11] has discussed the state of primary education in West Bengal. It mainly discussed the quality on different parameter.

Rana *et al.* (2005)[12] made a case study in West Bengal on Public-private interface in primary education. It discussed different Primary Schooling Institutions and the extent of private schooling. It identified e different types of schools and delivery of education in different primary schools which included School Infrastructure and Teachers, Attendance, Cost of Schooling, Assistance in Learning Outside the School, Learning Achievement of Children, Correlation between Expenditure and Learning Achievement, Choice of School and so on.

Regev *et al.* (2008)[13] shown an experiential learning approach on Requirements engineering education in the 21st century. It discussed the active, affective, experiential pedagogy offered to students as an opportunity to experience a simulated work environment that demonstrates the complexity and richness of a development organization's social/design problem to create some new products.

Som *et al.* (2014)[14] worked on Literacy and their differential in West Bengal. It made the study on the regional disparity in literacy in the state at the district level) for 2011. It collected the detailed data from census and ministry of education department West Bengal and made the segmental disparity in literacy on gender, rural - urban, rural male-female and urban male-female in the state with same reference time period. It has explained disparities with a set of explanatory variables and formulate suitable plan for reduce the disparities for stimulate all round development in West Bengal.

Background

To find the Requirement of Digital Education in different Universities in West Bengal, India, it is necessary to analyze the current status of the different universities in West Bengal, India. To get the necessity and potential for implementation of digital education, it is necessary to discuss the current number and status of higher education institutions in West Bengal, India. There are different types of Universities present in West Bengal. Central University, State University, Private University and Deemed to be University are the type of University present in West Bengal.

As on 25th November, 2022 West Bengal has 50 numbers of Universities among that One Central University, Thirty Six State Universities, Eleven Private Universities and Two Deemed to be Universities. In 2009 – 2010 West Bengal has 17 numbers of Universities among that One Central University, Fifteen State Universities and One Deemed to be University. There was no Private University at West Bengal in 2009 – 2010. In 2014 – 2015 West Bengal has 26 numbers of Universities among that One Central University, Twenty Three State Universities, One Private University and One Deemed to be University. In 2019 – 2020 West Bengal has 39 numbers of Universities among that One Central University, Twenty Six State Universities, Ten Private Universities and Two Deemed to be Universities. Fig. 1 shows year wise number of different types of Universities in West Bengal, India. After comparing the number of Universities it has found that the number of different types of Universities in West Bengal, India has been continuously increasing over the time.

Table 1: Number of Universities in West Bengal (2022) [as on Date- 25.11.2022]

Sl. No.	Types of University	Number of University
1	Central University	1
2	State University	36
3	Private University	11
4	Deemed to be University	2
Total		**50**

Source: University Grants Commission Website

Table 2: Number of Universities in West Bengal (year wise)

Year	Central University	State University	Private University
2009-2010	1	15	0
2014-2015	1	23	1
2019-2020	1	26	10

Source: University Grants Commission Website.

Number of student studied in different Universities also important aspect for the analyzing of Requirement of Digital Education in Different Universities in West Bengal. Students are the main stakeholder of the Digital Education. To implement the Digital Education in the Universities in West Bengal the number of students should get the first priority. If the number of student enrollment has compared then it has been found that – in the year 2009-2010 Number of Students in Higher Education in West Bengal were

1016305 among them 587546 were Male and 428759 were Female Students. There was 4184 M.Phil/ Ph.D students among them 2685 were Male and 1499 were Female Students. There was 85212 Post Graduate students among them 49253 were Male and 35959 were Female Students. There was 926909 Under Graduate students among them 535608 were Male and 391301 were Female Students.

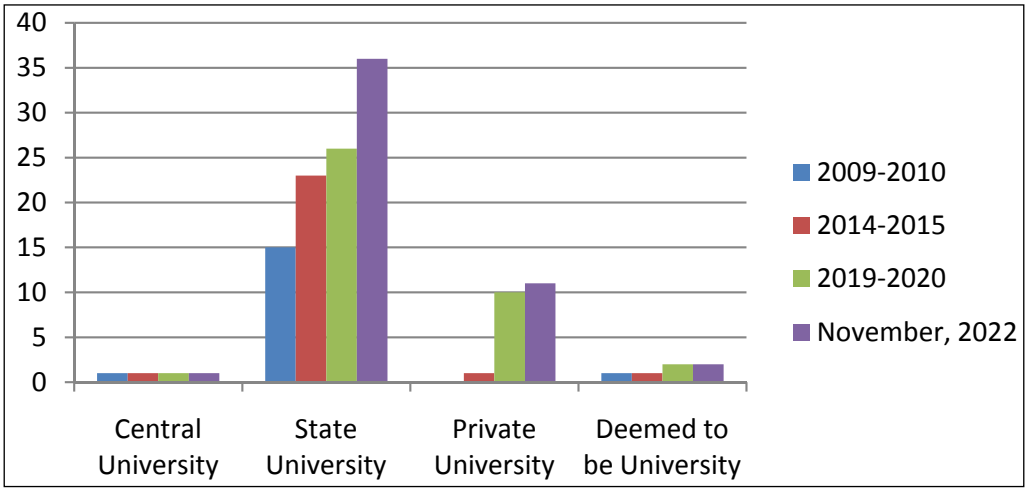

Fig. 1: Number of different types of Universities in West Bengal (year wise)

In the year 2014-2015 Number of Students in Higher Education in West Bengal were 1787516 among them 954126 were Male and 833390 were Female Students. There was 5860 M.Phil/ Ph.D students among them 3925 were Male and 1935 were Female Students. There was 188211 Post Graduate students among them 86250 were Male and 101961 were Female Students. There was 1593445 Under Graduate students among them 863951 were Male and 729494 were Female Students.

In the year 2019-2020 Number of Students in Higher Education in West Bengal were 1953822 among them 937053 were Male and 1016769 were Female Students. There was 10714 M.Phil/ Ph.D students among them 9258 were Male and 1456 were Female Students. There was 153025 Post Graduate students among them 62665 were Male and 90360 were Female Students. There was 1790083 Under Graduate students among them 865130 were Male and 924953 were Female Students. Fig. 2 shows year wise the numbers of Male and Female student enrolled in various programs of different universities in West Bengal.

Table 3: Number of Students in Higher Education in West Bengal in the year 2009-2010

Sl. No.	Level	Male	Female	Total
1	M.Phil/ Ph.D	2685	1499	4184
2	Post Graduate	49253	35959	85212
3	Under Graduate	535608	391301	926909
Total		587546	428759	1016305

Source: University Grants Commission Website.

Table 4: Number of Students in Higher Education in West Bengal in the year 2014-2015

Sl. No.	Level	Male	Female	Total
1	M.Phil/ Ph.D	3925	1935	5860
2	Post Graduate	86250	101961	188211
3	Under Graduate	863951	729494	1593445
Total		954126	833390	1787516

Source: University Grants Commission Website.

Table 5: Number of Students in Higher Education in West Bengal in the year 2019-2020

Sl. No.	Level	Male	Female	Total
1	M.Phil/ Ph.D	9258	1456	10714
2	Post Graduate	62665	90360	153025
3	Under Graduate	865130	924953	1790083
Total		937053	1016769	1953822

Source: University Grants Commission Website.

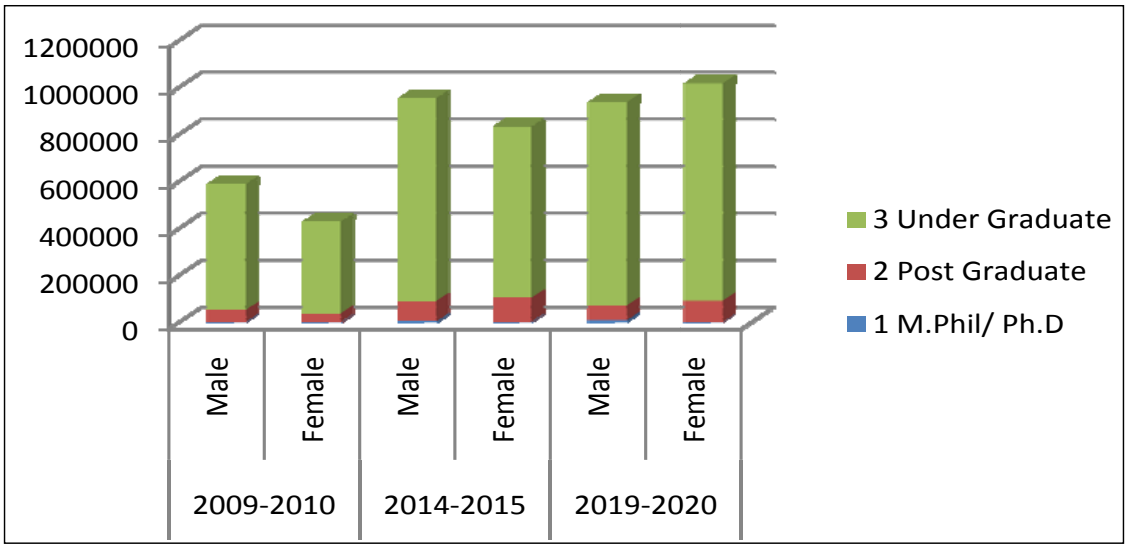

Fig. 2: Numbers of Male and Female students enrolled in various programs of different universities in West Bengal, India

It has been observed that the number of students have gradually increasing in different Universities in West Bengal. Another important aspect to get aware about the Universities present in West Bengal, India. Table 6 shows different types of Universities in West Bengal, India as on 25th November, 2022.

Table 6: List of Universities in West Bengal [as on Date-25/11/2022]

Sl. No.	Types of University	Name of University	Number of University
1	Central University	Visva Bharati University	1
2	State University	Alipurduar University	36
3		Aliah University	
4		Bankura University	
5		Biswa Bangla Biswabidyalay	
6		Bidhan Chandra Krishi Vishwavidyalaya	
7		Cooch Behar Panchanan Barma University	
8		Dakshin Dinajpur University	
9		Darjeeling Hills University	
10		Diamond Harbour Women's University	
11		Harichand Guruchand University	
12		Hindi University	
13		Jadavpur University	
14		Kanyashree University	
15		Kazi Nazrul University	
16		Mahatma Gandhi University	
17		Maulana Abul Kalam Azad University of Technology	
18		Murshidabad University	
19		Netaji Subhash Open University	
20		Presidency University	
21		Rabindra Bharati University	
22		Raiganj University	
23		Rani Rashmoni Green University	
24		Sadhu Ram Chand Murmu University of Jhargram	
25		Sidho-Kanho-Birsha University	
26		The Sanskrit College and University	
27		The West Bengal National University of Juridical Science	
28		The West Bengal University of Health Sciences	
29		The West Bengal University of Teachers' Training, Education Planning and Administration	
30		University of Burdwan	
31		University of Calcutta	
32		University of Gour Banga	
33		University of North Bengal	
34		Uttar Banga Krishi Vishwavidyalaya	
35		Vidyasagar University	
36		West Bengal State University	
37		West Bengal University of Animal and Fishery Sciences	

38	Private University	Adamas University	11
39		Amity University	
40		Brainware University	
41		JIS University	
42		Seacom Skills University	
43		Sister Nivedita University	
44		St. Xavier's University	
45		Swami Vivekananda University	
46		Techno India University	
47		The Neotia University	
48		University of Engineering and Management	
49	Deemed to be University	Indian Association for the Cultivation of Science (IACS)	2
50		Ramakrishna Mission Vivekananda Educational and Research Institute	

Source: University Grants Commission Website.

Requirement of Digital Education in West Bengal

Many students have studied at different institutions in West Bengal. There is huge potentially to implement digital education in West Bengal. Different kind of Universities like Central Universities, State Universities, Deemed to be Universities and Private Universities have their own curriculum, syllabus, teaching staffs, campus, infrastructure and so on, but the mode of study is probably same. Mainly, the universities follow the face to face mode of studies. In West Bengal some universities offer distance mode of learning but they do not have any proper digital education infrastructure. So it is very much necessary to setup the digital education infrastructure in the universities of West Bengal.

To give the flexibility to the student, it is necessary to implement digital education in West Bengal. The students are the main part of the institutions, so the prime focus of the institutions should be student oriented. To provide the high quality of education to the all student, it is necessary to upgrade existing system with the incorporation of modern technologies. Use of modern and emerging Technologies help the students to clear the concept about the topic. The time bound, traditional, class room oriented education system will get a new dimension. The student would attract with the new infrastructure and would get more motivation in their study. The system would become more flexible, scalable, attractive and efficient. As the total system is Technology dependent, so it is available 24 × 7. The students would be able to read anything at anytime and from anywhere.

Infrastructure is one of the important aspects of digital education in West Bengal. The Universities have to set up a new Technology based infrastructure to properly implement the digital education in the different Universities and different educational institutions. The normal classroom has to convert it into digital based smart classroom. Each class room should have projector, audio - video system and computer. The universities have well-equipped Laboratories and should have original and updated software in the Computers. The computer laboratories should have printer facility which could be used by the student as they needed. All the computers should connect with each other by proper network connection. The campus of the institution should have high speed internet facility. The student should be able to access the internet

facility as they required. The library should have the access of the modern journals and periodicals. The student should also be able to get the current edition of the well-known journals.

Digital education also helps to provide different kind of facilities to the faculty of the institution[9]. It is very much necessary for the Teachers to continuously update themselves with current information. Various educational portals and many educational applications help gather new knowledge. It is also necessary for the faculty to get various training and various faculty development programs regularly. Faculties are the one of the important stakeholders in this digital education platform. So the faculties have to be efficient to use the technology based system. The technology based system helps the faculties to gather new knowledge and share the knowledge with the students. The faculties would also able to manage the students' performance more easily and efficiently. The technology based system help the faculties to identify the students' learning difficulties. It would help to manage student progress. By the use of different ICT based equipment the teachers would be able to explain any concept more easily which directly increase the quality of education.

Digital Education will give many advantages to the institutions and the universities. It helps to manage huge number of students who are studied in different universities, colleges and educational institutions. The technology based system will help to track the students' overall performance. From advertisement of the course/program to form fillup, from admission fees payment to admission, from fees collection to fees management, from Student enrollment to class scheduling, from examination to evaluation, from result calculation to result storage everything could be possible to manage efficiently with the implementation of different modern technologies. There is different types of universities and different type of institutions in West Bengal. The universities also have more than one campuses present in different locations. The curriculum, syllabus, academic calendar, class routine and so on are different in all the university and institutions. Diverse Educational Institutions use different academic, administrative and cultural environment in their institutions. So it is difficult to make the collaboration between the institutions and universities. By the use of digital education in education sector, it is easily possible to make the collaboration between the Universities and institutions. It could be possible to share the resource between the universities. It could also be possible to share different resource person between the institutions. One faculty from one institution may share the knowledge with other institution's students. The faculty may take the classes or give the lecture to any conference, symposium, seminar or workshop. It is also possible to share the knowledge of any faculty or various types of resources between various departments of any universities or any colleges. In traditional educational system the geographical location and the time of travel are the barrier for the resource person. Digital education system solves this problem by attending program through online mode. By the use of internet, it is possible to share the knowledge without wasting the travel time. Thus it is possible to make the collaboration between Inter University and Inter University events.

Digital Education will also help to monitor the student attendance. In some cases the students may go to a different geographic location for any personal reason. In this case the student would not able to attend the classes regularly. By attending online class, it is possible to attend the class by the student. Through the online mode education, it is possible to reduce the absent of the student and improve the attendance in the class. The student may access the traditional class room lectures from a remote place by the use of online based remote access facility. It also provides the storage facility show the student may view the classes at their convenience at any time and from any where. They may access the video as much as

they want. Digital education also helps to get the personalized and customer is study material. Efficiently designed study material help the student to get better and easy understanding of the concept. The study material may have audio, video, PDF or text documents. The study material created in local language help the student to understand the concept easily. Digital education also provides huge variety of courses and programs. There is no restriction of the courses, the student may get the knowledge regarding any topic or any subject.

In West Bengal, there has also Open Universities like Netaji Subhas Open University, Indira Gandhi National Open University and others open universities which offer various courses to the students. Rabindra Bharati University, Vidyasagar University and The University of Burdwan offers distance mode of education. The student may also enroll themselves for different types of programs in distance learning mode in these Universities. Massive Open Online Course (MOOC) is a good initiative for the students. There is a huge prospect for the student if the whole system adopts the digital education. The student will get more benefits by attending the classes and getting the study material digitally. The adaptation of digital education, the existing system will convert into smart and efficient system.

Challenges of Digital Education

It is very challenging to implement the digital education in West Bengal, India. There are various reasons behind it. The main challenge is the lack of infrastructure in different type of universities in West Bengal. It has been observed that the absence of utilization of basic Technologies and emerging Technologies in real time implementation in University Management System. It also faces the technical issues and technological issues. The administrators, staffs and the faculties are the important stakeholder of this digital education University end. So the knowledge of them are very much necessary for the proper management of the system. So, it is necessity to conduct the digital literacy campaign and different workshop in this regard.

One of the important challenges of digital education is the lack of motivation among the students. As there has the provision to hide themselves by turn off camera and microphone, so the students take the advantage of this. Thus the online mode faces lack of discipline among the student. Online system has another problem that it has lack of face to face interaction. The student faces hesitation to interact online with the speaker. So there is a communication problem persist in the digital education. Another challenge in digital education is to maintain the quality of the study materials. It is very difficult task to supply the personalized and customize study material to the all students. It is not possible to all round development of the student which directly affect the quality of learning.

It has a conception among the students and the parents are that the value of the online degree is not as valuable as face to face on campus based regular mode programs. The course structure of the program is not clear to the students, so the students lost their interest on digital education. To maintain the security of the whole system is also a challenging job. So, the data security is the primary challenge of the digital education.

CONCLUSION

The requirement of digital education is very high in universities of West Bengal, India. Digital education has lots of advantages over the traditional education system. It also faces some challenges to implement the digital education in all type of universities and higher educational institutions in West Bengal[10]. To

implement the digital education in all type of universities, it is necessary to overcome the challenges as soon as possible. To overcome the infrastructural problem, it is necessary to build strong network of information technology (IT) and Information and Communication Technology (ICT). It is necessary to invest to create strong internet networks among the campus and give the free access of the student to get the study materials and the National and international journals and periodical. Non-profit organizations (NGO) should encourage in investing for the betterment of the students. It is also necessary to create new software for the Child With Special Needs (CWSN). Mainly the voice enabled software and gesture control software are very helpful for the special child.

It is also necessary to restructure the present courses and programs. The courses should be flexible in nature and it should be divided into smaller modulus. Admission fees should also be less costly. The student should access all study materials digitally and should be available 24 × 7. It is necessary to start the number or credit transfer system. The government should recognize the online degree. Considering different aspect of Digital Education, it is necessary to implement the digital education in all types of universities and higher educational institutions of West Bengal, India.

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REFERENCES

1. Benešová, A. and Tupa, J. 2017. Requirements for education and qualification of people in Industry 4.0. *Procedia Manufacturing*, **11**: 2195-2202.

2. Chakrabarty, A.K., Richardson, J.T. and Sen, M.K. 2016. Validating the course experience questionnaire in West Bengal higher secondary education. *Studies in Educational Evaluation*, **50**: 71-78.

3. Jana, S.K. 2017. Higher education in West Bengal: An overview. *Artha Beekshan*, **26**(1-2): 21-55.

4. Manna, R. and Jayanta, M. 2016. Secondary teacher education system in India with special reference to West Bengal. *International Journal of Humanities and Social Sciences*, **5**(3): 97-111.

5. Mukherjee, K. and Bear, S. 2017. The challenges and opportunities to implement inclusive education in West Bengal. *International Journal of Humanities and Social Science Invention*, **6**(12): 38-43.

6. Mukhopadhyay, H. 2008. The role of education in the empowerment of women in a district of West Bengal, India: reflections on a survey of women. *Journal of International Women's Studies*, **10**(2): 217-225.

7. Ouhbi, S., Idri, A., Fernández-Alemán, J.L. and Toval, A. 2015. Requirements engineering education: a systematic mapping study. *Requirements Engineering*, **20**: 119-138.

8. Paul, P.K. 2021. Digital Education: From the Discipline to Academic Opportunities and Possible Academic Innovations—International Context and Indian Strategies. In *Digital Education for the 21st Century* (pp. 255-281). Apple Academic Press.

9. Paul, P.K., Bhuimali. A., Aithal, P.S. and Rajesh, R. 2018. Digital Education and Learning: The Growing Trend in Academic and Business Spaces—An International Overview. *International Journal of Recent Researches in Science*, *Engineering & Technology,* **6**(5): 11-18.

10. Paul, P.K., Bhuimali, A. and Aithal, P.S. 2017. Indian higher education: With slant to information technology—a fundamental overview. *International Journal on Recent Researches in Science, Engineering & Technology*, **5**(11): 31-50.

11. Rana, K., Das, S., Sengupta, A. and Rafique, A. 2003. State of primary education in West Bengal. *Economic and Political Weekly*, pp. 2159-2164.

12. Rana, K., Santra, S., Mukherjee, A., Banerjee, T. and Kundu, M. 2005. Public-private interface in primary education: A case study in West Bengal. *Economic and Political Weekly*, pp. 1550-1555.

13. Regev, G., Gause, D.C. and Wegmann, A. 2008. Requirements engineering education in the 21st century, an experiential learning approach. In *2008 16th IEEE international requirements engineering conference* (pp. 85-94). IEEE.

14. Som, K.S. and Mishra, R.P. 2014. Literacy and their differential in West Bengal. *International Journal of Science and Research*, **3**(6): 1537-1545.

15. University Grants Commission. 2022. University Grants Commission. Retrieved November 25, 2022, from https://www.ugc.gov.in/