A STUDY ON IMPACT OF COVID 19 ON EDUCATION SYSTEM USING DATA MINING TECHNIQUES

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Abstract: The outbreak and the scale as a global pandemic of COVID-19 during this year has severely affected the education sector worldwide. The student population of the countries have been suffering much with primarily the lack of information about the modes and strategies of education conduct by the administrative bodies. In these trying times when most of the countries are adapting the internet-based teaching-learning strategy, the dire need of assessment of the methods implemented cannot be overlooked. In the educational pedagogy study, the analysis and indexing of the student's satisfaction level should be of a prime concern of research. This paper primarily focuses on the study of various proposed methods till now to keep a record of the applied strategies and proposes the implementation of the Rasch analysis on the student satisfaction level. Moreover, the review of the works done till now is also carried out in order to investigate any scope of future work to provide a more efficient and effective method for the teaching-learning experience of the students in these trying times.

Introduction:
For the first time in the history of human civilization, a worldwide pandemic has caused damage in all possible public and private sectors. Starting from the international economy to cottage industry, to education and agricultural sectors, have been severely damaged with the global outbreak of COVID-19 pandemic. The pandemic first case detected in Wuhan, China in December of 2019, exponentially has been spreading throughout the world. With overflowing hospitals globally, the fear of untimely death has grabbed the attention of the mass in such a manner, that inevitably the education sectors are facing serious damage. Regular and standard learning methods or physical classes are being seized under complete lockdown [1]. Bhutan acted as a pioneer in this regard, locking down the schools from March 6, 2020. Following the idea globally educational institutes are being locked down keeping the health of the staff members and students in mind. As alternative methods of education internet-based learning platforms are being introduced. Various tools' implementation is allowing the educators and learners to continue their educational schedule intact. But numerous challenges are being faced in the field as well, as lack of resources, economic backlogs, technological unavailability etc.

But the need of monitoring the implemented strategies in these times has become of prime concern. Where the evaluation of the students on the basis of their learning degree was the prime concern of evaluation in the standard procedure, now the satisfaction level of the students should also be indexed to make the evaluation proper. In the following sections as we discuss the literature survey of the works already done on this concern, we have proposed to implement the Rasch analysis on the questionnaire to index the student satisfaction level for better evaluation [2].

The Disruption in Education System:
The outbreak of the COVID-19 pandemic was a worldwide catastrophe that in almost every possible way disrupted the standard and classical approach of the teaching-learning process. The educational institutes such as schools and colleges were shut down, the examination schedules were jeopardised. 1.6 billion learners over 200 countries were seriously affected in their regular teaching-learning system as well as their academic year got severely hampered [3]. Education being a pillar of a nation, when gets affected for a complete academic year, the growth of the nation takes a great hit. Bhutan as implemented the first closure on the educational institutes, gradually administrative bodies worldwide have decided to do the same. In such condition, nations came up with the idea of alternative education system to implement. Widely popular strategies were,
1. zero-fee internet educational resources (availability of study materials and similar resources through internet in open access mode),
2. free online learning resources (various open-source websites that provide learning tools) and
3. broadcasts teaching (video call-based classrooms).

Inevitably that did not conduct a smooth teaching-learning experience to a wide audience. The lack of internet connectivity and technological advancement, these strategies, though useful on their own infrastructure failed on a wider basis.

Study on the Impact of Teaching-Learning:
Sumitra Pokhrel and Roshan Chhetri in their work have pointed out a very grave issue in the post COVID scenario of the education sector; the loss of the 2020 academic year [4]. With the seizure of the face-to-face learning opportunity the need in the exploration in the domain of internet-based teaching-learning experience has become an essential and competent area of research. In their paper they have distinguishably identified and categorised the major challenges of the internet-based learning experience, such as
1. Accessibility
2. Affordability
3. Flexibility
4. Learning pedagogy
5. Life-long learning
6. Educational policy.

In most of the cases a huge population of the students come from a rural and economically lacking backgrounds. For their livelihoods are not enough equipped for the internet-based learning experience, the learning pedagogy of the students have been seriously damaged. On the other hand, internet-based student evaluation procedure/ examinations have failed to implement an effective plagiarism check strategy for the evaluation system [5].

Assessing Satisfaction Level of Online Learning:
With a very unique approach Hanan E. Abdelkader et.al have proposed in their work to implement the feature selection aspect of the collected data set from the students and with standard data mining classification algorithm they have experimentally analysed the fitness values [6]. Using the k-nearest neighbour and support vector machine algorithms they have evaluated different cardinalities in terms of prediction accuracy. Experimentally they have reduced the feature size up to 80% and classification accuracy up to 100%.

Proposed Method:
With the sudden increase in the internet-based learning the student satisfaction has become one of the most important concerns to focus on. We focusing on this particular aspect propose the analysis of the same with the Rasch Analysis. We propose on the basis of the student satisfaction analysis questionnaire the collected data should be analysed through the Rasch Measurement model [7]. Though a variant of the item response theory Rasch Analysis has been chosen for this purpose for these following reasons:
1. Simpler approach for questionnaire response analysis,
2. Analyses the scores represented in Likert-type scale,
3. The analysis is parameter specific,
4. The parameters for analysis can be set on the situation specific basis, as needed for this scenario,
5. Ability of the parameters to be fit according to the expected output from the algorithm.
On the basis of these points, we have chosen the implementation of the Rasch Analysis for the student satisfaction level. The output for a single row of data will be calculated as

$$Pr\{X_{ni} = 1\} = \frac{exp(\beta_n - \delta_i)}{1 + exp(\beta_n - \delta_i)},$$

where the symbols are used as standards.

Conclusion:
Coming days will show the real horror of the pandemic today. With the hamper of the 2020 academic year for student community around the globe, the beginning of the damage can be considered to be set. The need to implement efficient alternative teaching-learning methods is dire in this hour. And the efficiency of the implementation is dependant on the performance indexing of the strategy. We hope to experimentally implement our proposed method soon on first hand data that is yet to collect for the time being.

Reference:
[1] Ms. Toshika Pareek, Dr. Kiran Soni, A COMPREHENSIVE STUDY ON COVID-19 PANDEMIC: AN IMPACT ON SCHOOL EDUCATION IN INDIA, Amity Journal of Management Amity Business School, Amity University Madhya Pradesh Vol. VIII, No. 2, July-December 2020 ISSN: 2347-1832 (Print)| ISSN: 2581-5261 (Online)
[2] D. Andrich, Rasch Models, International Encyclopedia of Education (Third Edition) 2010, Pages 111-122, https://doi.org/10.1016/B978-0-08-044894-7.00258-X
[3] Marko Teräs, Juha Suoranta, Hanna Teräs, Mark Curcher, Post-Covid-19 Education and Education Technology 'Solutionism': a Seller's Market, Postdigital Science and Education (2020) 2:863–878 https://doi.org/10.1007/s42438-020-00164-x, 2020
[4] Sumitra Pokhrel, Roshan Chhetri, A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning, Higher Education for the Future, doi: 10.1177/2347631120983481.

[5] Krishna, Praveen Kumar V, Prediction and Analysis of Data Mining Models for Students Underlying Issues during Novel Coronavirus (COVID-19), Special Issue - 2020, International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181 NCAIT - 2020 Conference Proceedings

[6] HANAN E. ABDELKADER, AHMED G. GAD, AMR A. ABOHANY, SHAYMAA E. SOROUR, An Efficient Data Mining Technique for Assessing Satisfaction Level of Online Learning for Higher Education Students during the COVID-19, IEEE Transaction, DOI 10.1109/ACCESS.2022.3143035, IEEE Access

[7] Rasch Lectures. (Introduction) In honor of Georg Rasch's 100 years birthday on the 21th of September, 2001. Edited by Lina Wølk Olsen and Svend Kreiner, Copenhagen Business School, September, 2001.