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Deep Data Mining And Hadoop Simulation In Computerized Systems

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Abstract: In this investigation, he main aim was to determine how effective and feasible it would be to exploit idle computational storage. Architecturally, the proposed model was that which relied on HDFS (Hadoop Distributed File System). Also, CPN tools were used during model implementation. Hence, the tools constituted CPN ML programming language and Colored Petri Dish Nets. To ensure that the availability of the workstations was characterized within the model, the data collection process occurred in a computer lab for about 40 days. In the findings, it was established that when three tests in the form of a physical test, a cloud test, and a simulation base test are applied, the deep data locality approach yields a significant improvement in the Hadoop performance. Particularly, the use of the deep data locality technique led to a 34 percent improvement in the Hadoop system. Thus, it was concluded that the superiority of the proposed approach arises from its ability to yield a reduction in the HDFS data movement.

1. INTRODUCTION

In the contemporary world, hard disks have increased in the storage capacity, such that their storage comes in terabytes, rather than gigabytes [1]. As a result, some unused space exists in most of the institutions' workstations [2]. With the resultant state reflecting some form of resource wastage or underutilization, there has been the establishment of distributed file systems, which combine software and hardware in the available storage capacity's network [3]. Of importance to note, however, is that a challenge comes when it reaches a level of designing the systems, especially because any failure in hard disk operation could prompt the shutdown of the desktop computers. The disk failure could also result in applications stoppage and network collapse [4]; hence, unreliable service provision to the end-users or customers [5]. The aim of this study was to determine how feasible it would be to simulate and model how an HDFS-based distributed file system would behave in large workstation clusters. Every aspect requires efficient management (Abdul Jalil et al., 2021; Mohd Noh et al., 2021; Mustafa et al., 2021; Roszi et al., 2021; Tumisah et al., 2021).
In the contemporary world, there is a significant increase in the volume of global data [1]. Hence, there is growing demand for big data analytics that could be deemed more efficient. During the bid data processing, therefore, one of the platforms of frameworks that have played an essential role is the case of Apache Hadoop. Indeed, this model relies on the phenomenon in which the aim is to move computation, an option deemed cheaper compared to the movement of data [2, 3]. In traditional systems of data processing, the arrangements hold that there is the movement of the target data to the servers for purposes of processing. However, some studies affirm that this approach ends up creating data transfer bottlenecks [4,

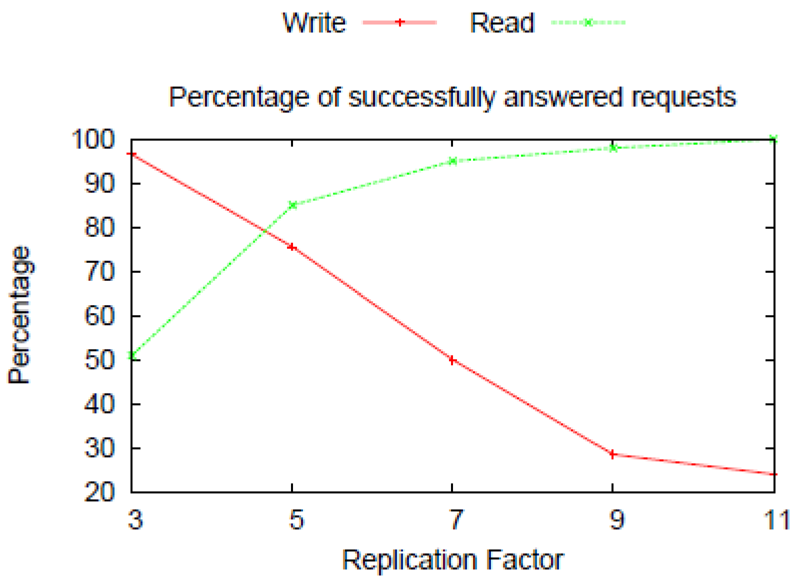
5]. If it is managed well, various problems can be avoided (Irma et al., 2021; Suzana et al., 2021; Rohanida et al., 2021; Nazrah et al., 2021; Shahrulliza et al., 2021).
A practical illustration demonstrating the limitation of the traditional systems is that in which a speed of 100 MB/s was used during the coping of 1 TB data on some hard drive, which requires about three hours before completing [6]. Even in situations where there is the division of such data in terms of 100 hard drives, the decision to copy 10 GB to a selected server would require close to 100 seconds [7, 8-15]. To address such a bottleneck, Hadoop can be seen to send codes to the target servers, ensuring that the data transfer overhead is either removed or reduced [9, 10]. The latter process translates into a state of data locality, aimed at enhancing the Hadoop performance significantly. All aspects require effective leadership and management (Mohd Arafat et al., 2021; Sumaiyah et al., 2021; Hifzan et al., 2021; Shahrul et al., 2021; Helme et al., 2021).

2. METHODOLOGY

The initial step involves the use of colored Petri nets to model the HDFS in workstation clusters. Also, this modeling involved the use of CPN tools or modeling language, especially because the CPN approach is graphical oriented, combining its strength with the programming language in CPN ML towards system verification, simulation, specification, and design.The next step constituted the ClientNode modeling process. Indeed, the role of the ClientNode was expected to involve a random generation of requests to write and read files for users. Furthermore, he ClientNode was expected to play the role of stimulating user interface programs interacting with Hadoop file systems.The methodological approach proceeded to focus on the namenode modeling. Indeed, the role of the namenode was expected to constitute the server's logic implementation, with the role of the server's logic lying in the File System Namespace management. For the case of the FSN color set, this study developed it in the form of a record with the collected metrics, the list of replicated blocks, the priority queue of the blocks requiring replication, the cluster's all DataNodes' bidimensional map, the BlockInfo list, and the FileInfo list.The final stage involved DataNode modeling. In this study, the development of the DataNode module was designed in such a way that it would receive and send messages with answers and actions to other nodes. An example was that in which, if the ClientNode send messages to the module, these messages would permit the writing of new or the reading of store-blocks.Regarding considerations concerning the availability of workstations, the selected HDFS would split files to form blocks, which would, eventually, be stored in the workstation clusters' various nodes.As mentioned above, a novel approach was proposed to add to the superior performance of all MR stages' locality. The motivation lay in the criticality of minimizing the shuffle's overhead. Indeed, the proposed DDL approach sought to deviate from the map-only locality approach. It is also notable that two types of DDL were investigated in relation to the ability to extend the locality to all MR stages. One of them entailed the block-based DDL aimed at reducing data transfer and reducing the RLM in multicore processors. Importantly, when the multicore processors are employed, they imply that all cores share common local disks; suggesting that between the cores, there is no data transfer overhead. Another DDL method involved the key-based DDL technique, which functioned by pre-arranging elements of data within the input data based on their keys. In so doing, only data elements meant for the given reducers would be assigned to the same mappers; preventing data transfer. The data element pre-arrangement would also be accomplished before the map stage. The following figure demonstrates the correlation between the key-based DDL, the block-based DDL, and the SDL (traditional map-only locality) relationship. Every organization values perfect management in ensuring success (Farah et al., 2021; Syahrul et al., 2021; Quah et al., 2021; Ahmad Syarifuddin et al., 2021; Jumiah et al., 2021).

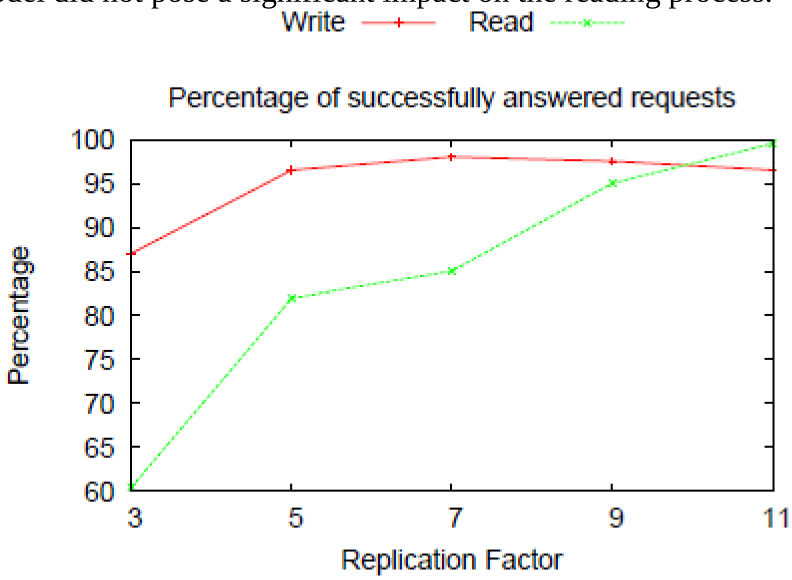
3. RESULTS AND DISCUSSION

The main objective was to assess the modeled system's behavior. Indeed, several simulations were performed. With the methodological approach that was adopted described above, there was a configuration of several parameters. Examples of these variables included probabilities of hard disk erasing in case of a reset of the workstation, the maximum and minimum values required for the random generation of the file sizes, the size of the blocks, and the maximum and minimum values required for the random generation of the DataNodes' initial free space. Other parameters included the end hour, the initial hour, the number of hosts for each rack, the number of racks, the number of data centers, the number of requests to be read, the number of requests to be written, and the replication factor, with fault tolerance gained after gradually increasing the replication factor. The success of something depends on good and efficient management (Mohd Ali et al., 2021; Parimala et al., 2021; SitiJamilah et al., 2021; Nor Fauziyana et al., 2021; Noel et al., 2021).
The figure below demonstrates the simulation outcomes that were obtained. Particularly, the figure shows the proportion of the request for reading and writing files answered successfully, especially with an increase in the replication factor. From the findings, it is evident that there was an increase in the successful answers of reading. However, the successful answers of writing decreased.The best way is to do efficient management (Ahmad Shafarin et al., 2021; Junaidah et al., 2021; Farah Adibah et al., 2021; Ahmad Shakani et al., 2021; Muhamad Amin et al., 2021). This demonstrates that the importance of something being managed well (Santibuana et al., 2021; Nor Diana et al., 2021; Zarina et al., 2021; Khairul et al., 2021; Rohani et al., 2021; Badaruddin et al. , 2021, Abdul Rasid et al., 2021)



This study established further that there was a decrease in the writing requests' reliability due to the HDFS source code-implemented constraint. The constraint arose in such a way that the ClientNode rejected the pipeline that the NameNode had sent, especially if there was interruption in the pipeline and also if one or more DataNodes were unavailable. In such scenarios, ClientNodes would go back to the NameNodes to establish new replica location lists for the blocks. With an increase in the pipeline length causing an increase in the probability of establishing not-connectable pipelines, this trend would explain why the percentage of the writing process was low.

To achieve the writing process' good readability therefore, especially with chaotic environments leading to the aforementioned constraint, there was a need for relaxation. In chaotic environments, there tends to be a random change in the status of machines. To respond to this compromised state, the proposed model was modified in such a way that rather than pipeline rejection in situations where one or more DataNodes were out of service, the ClientNodes would accept them on the condition that the DataNodes available for block copying exceed 1, which was the specified threshold in the simulation study. With a replication strategy developed in HDFS, this modified procedure did not affect the reading process significantly. Following the aforementioned modification, there was an increase in the rate of writing requests' successful responses. At the same time, this implementation of the modified model did not pose a significant impact on the reading process.



This experimental study involved the testing of the performance of Hadoop in three environmental scenarios. The objective lay in the comparison of the performance between traditional data locality and DDL. Also, there was a simulation to discern the proposed model's performance in different conditions. The collection of the experimental data was achieved using a small testbed in hardware.

Initially, there was the testing of the performance of Hadoop on cloud. The three sets of data on the focus included two 120 GB data, two 60 GB data, and two 30 GB data. To achieve outcome reliability and validity, the execution of the test occurred ten times before averaging the outcomes. From the results, the use of the block-based DDL approach yielded a significant reduction in shuffle time, ranging between 18 percent and 30 percent In a quest to verify the accuracy of the simulation and analytical models that were employed, this experimental investigation proceeded to test the performance of data locality relative to hardware implementation. Hence, there was the configuration of a small Hadoop cluster in which five machines were used, with four of them meant for slave nodes while one of them was meant for the master node. From the figure that follows, there was an improvement in performance with the addition of more data locality. Compared to the case of the default MR, there was an increase in speed by 21.9% when key-based DDL was employed. For the case of the block-based DDL, the increase in speed stood at 9.8%. At a point where there was a combination of key-based and block-based DDL schemes, the increase in the speed of performance stood at 34.4% compared to the case of the default MR.

4. CONCLUSION

In summary, the main purpose of this investigation was to establish a Colored Petri Dish framework. This model was poised to test and explore new configurations, as well as some of the other strategies exhibiting different features from those that the HDFS system implements. In the proposed model, the study involved the simulation. The purpose of the simulation activity lay in the criticality of assessing the system's behavior, given the workstation's clusters. With uniform and binomial distribution functions incorporated, there was the generation of the idle time, given an hour's number of powered-on computers. From the findings, the simulation outcomes demonstrated that the critical constraint determined the pipeline rejection or acceptance, with the NameNode returning the rejected pipeline. Given the dedicated machines' clusters, this framework was found to work well. However, if responses exceeding 95% were to be achieved, which would imply a high percentage and satisfactory responses, the proposed model would require modification in which the critical constraint would be relaxed.The two DDL methods that were implemented included key-based DDL and block-based DDL. The implementation involved a combination of these two schemes on HDFS, a decision that saw an increase by over 34.4% in system performance compared to a scenario entailing the default MR. tested on the physical implement Hadoop system, Hadoop simulation, and a cloud, the two schemes increased the performance of Hadoop by 21.9% and 9.8% for the key-based DDL and the block-based DDL (more than the default MR) respectively. When the schemes were combined, compared to the default approach, there was an increase in Hadoop performance by 34.4%.

5. REFERENCES

[1] Ratzer, A.V., Wells, L., Lassen, H.M., Laursen, M., Frank, J., Stissing, M.S., Westergaard, M., Christensen, S., Jensen, K.: Cpn tools for editing, simulating, and analysingcoloured petri nets. In: Applications and Theory of Petri Nets 2003: 24th International Conference, ICATPN 2003, Springer Verlag (2003) 450-462

[2] Borthakur, D.: The Hadoop Distributed File System: Architecture and Design. The Apache Software Foundation. (2007)

[3] Novaes, R.C., Roisenberg, P., Scheer, R., Northeet, C., Jornada, J.H., Cirne, W.: Non-dedicated distributed environment: A solution for safe and continuous exploitation of idle cycles. In: In Proceedings of the Workshop on Adaptive Grid Middleware. (2003) 107-115

[4] Anderson, D.P., Fedak, G.: The computational and storage potential of volunteer computing. In: Proceedings of the Sixth IEEE International Symposium on Cluster Computing and the Grid. CCGRID '06, Washington, DC, USA, IEEE Computer Society (2006) 73-80

[5] Bolosky, W.J., Douceur, J.R., Ely, D., Theimer, M.: Feasibility of a serverless distributed _le system deployed on an existing set of desktop pcs. SIGMETRICS Perform. Eval. Rev. 28(1) (June 2000) 34-43

[6] Basak, A.; Brnster, I.; Ma, X.; Mengshoel, O.J. Accelerating Bayesian network parameter learning using Hadoop and MapReduce. In Proceedings of the 1st International Workshop on Big Data, Streams and Heterogeneous Source Mining: Algorithms, Systems, Programming Models and Applications, Beijing, China, 12 August 2012; pp. 101–108.
[7] Iwazume, M.; Iwase, T.; Tanaka, K.; Fujii, H.; Hijiya, M.; Haraguchi, H. Big Data in Memory: Benchimarking In Memory Database Using the Distributed Key-Value Store for Machine to Machine Communication. In Proceedings of the 15th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, Beijing, China, 30 June–2 July 2014; pp. 1–7.
[8] Membrey, P.; Chan, K.C.C.; Demchenko, Y. A Disk Based Stream Oriented Approach for Storing Big Data. In Proceedings of the 2013 International Conference on Collaboration Technologies and Systems, San Diego, CA, USA, 20–24 May 2013; pp. 56–64.
[9] Islam, N.S.; Wasi-ur-Rahman, M.; Lu, X.; Shankar, D.; Panda, D.K. Performance Characterization and Acceleration of In-Memory File Systems for Hadoop and Spark Applications on HPC Clusters. In Proceedings of the International Conference on Big Data, IEEE Big Data, Santa Clara, CA, USA, 29 October–1 November 2015; pp. 243–252.
[10] Lee, S. Deep Data Locality on Apache Hadoop. Ph.D. Thesis, The University of Nevada, Las Vegas, NV, USA
[11] Lee, S.; Jo, J.-Y.; Kim, Y. Survey of Data Locality in Apache Hadoop. In Proceedings of the 4th IEEE/ACIS International Conference on Big Data, Cloud Computing, and Data Science Engineering (BCD), Honolulu, HI, USA, 29–31 May 2019.
[12] Lee, S.; Jo, J.-Y.; Kim, Y. Key based Deep Data Locality on Hadoop. In Proceedings of the IEEE International Conference on Big Data, Seattle,WA, USA, 10–13 December 2018; pp. 3889–3898.
[13] Lee, S.; Jo, J.-Y.; Kim, Y. Performance Improvement of MapReduce Process by Promoting Deep Data Locality. In Proceedings of the 3rd IEEE International Conference on Data Science and Advanced Analytics (DSAA), Montreal, QC, Canada, 17–19 October 2016; pp. 292–301.
[14] Elshater, Y.; Martin, P.; Rope, D.; McRoberts, M.; Statchuk, C.AStudy of Data Locality in YARN. In Proceedings of the IEEE International Congress on Big Data, Santa Clara, CA, USA, 29 October–1 November 2015; pp. 174–181.
[15] Qin, P.; Dai, B.; Huang, B.; Xu, G. Bandwidth-Aware Scheduling with SDN in Hadoop: A New Trend for Big Data. IEEE Syst. J. 2015, 11, 1–8
[16] Abdul Jalil Toha Tohara, Shamila Mohamed Shuhidan, Farrah Diana Saiful Bahry, Mohd Norazmi bin Nordin (2021). Exploring Digital Literacy Strategies for Students with Special Educational Needs in the Digital Age. Turkish Journal of Computer and Mathematics Education Vol.12 No.9 (2021), 3345-3358.
[17] Abdul Rasid Bin Abdul Razzaq, MohdNorazmi Bin Nordin, Mohamad Zaid Bin Mustafa, Badaruddin Bin Ibrahim (2021). Questionnaire for Special Education Leadership: A Pilot Study. LINGUISTICA ANTVERPIENSIA, 2021 Issue-1: 2587-2614
[18] Ahmad Shafarin Bin Shafie, SitiNurKamariahBintiRubani, AiniNazuraBintiPaimin, NavaratnamVejaratnam, MohdNorazmi bin Nordin (2021). Elements of Safety InJob Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5274-5278

[19] Ahmad Shakani bin Abdullah, IklimaHusnaBinti Abdul Rahim, Mohammad Halim bin Jeinie, Muhammad Shakir Bin Zulkafli, MohdNorazmi bin Nordin (2021). Leadership, Task Load And Job Satisfaction: A Review Of Special Education Teachers Perspective. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5300-5306

[20] Ahmad SyarifuddinCheAbd Aziz, TumisahbintiAkim, Abdul Halim Bin Ruseh, SarinaBinti Mail, MohdNorazmi bin Nordin (2021). Elements of Facility In Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5239-5243

[21] Badaruddin Bin Ibrahim, MohdNorazmi Bin Nordin, Mohamad Zaid Bin Mustafa Abdul Rasid Bin Abdul Razzaq (2021). Special Education Need The True Leadership: The Review. Turkish Journal of Physiotherapy and Rehabilitation; 32(3): 1622-1628.

[22] Farah Adibahbinti Ibrahim, Biamin Ahmad, Rehahbinti Ismail, Harlinabinti Ismail, MohdNorazmi bin Nordin (2021). Resource Elements In The Construct Of Special Education Teacher Workload In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5289-5293

[23] Farah AzalineyBintiMohd Amin, NoorsurayaMohdMokhtar, Farah Adibahbinti Ibrahim, Nishaalni, MohdNorazmi bin Nordin (2021). A Review Of The Job Satisfaction Theory For Special Education Perspective. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5224-5228

[24] Helme bin Heli, Senin M.S, Yusmi bin MohdYunus, KavitaVellu, Andrew Jason George, MohdNorazmi bin Nordin (2021). A Review Of The Educational Leaderships Theory For Special Education Perspective. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5217-5223

[25] HelmeHeli, Senin M.S, EkmilKrisnawatiErlen Joni, JuereanorBinti Mat Jusoh, MohdNorazmi bin Nordin (2021). Elements Of Experience In The Leadership Construct Of Special Education Head Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5279-5283

[26] HifzanBinti Mat Hussin, Nor MazlinaBintiMohamad, Syed Nurulakla Syed Abdullah, Ida RahayuMahat, MohdNorazmi bin Nordin (2021). Why Special Education Is Always In Our Hearts? Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5202-5210

[27] Irma ShayanaBteSamaden, Firkhan Ali Bin Hamid Ali, Nor ShadiraJamaluddin, Mazidahbinti Ali, MohdNorazmi bin Nordin (2021). Elements of Attitude In The Leadership Construct Of Special Education Head Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5151-5156

[28] Irma ShayanaBteSamaden, IrfahNajihah, ShalizaAlwi, RabiatulMunirah, MohdAdli bin MohdYusof, MohdNorazmi bin Nordin (2021). Time Element In The Construct Of Special Education Teacher Workload In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5141-5145

[29] Irma ShayanaBteSamaden, Senin M.S, Noor Lina bintiMohd Yusuf, Biamin Ahmad, MohdNorazmi bin Nordin (2021). A Pilot Study on The Influence Of Headmasters Leadership On Workload And Job Satisfaction Of Special Education Teachers In Johor, Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5157-5171

[30] JumiahbintiMustapa, SarinaBintiMohdYassin, FauziahbintiAni, Parimala A/P Palanisamy, MohdNorazmi bin Nordin (2021). Physiological Elements In Job

Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5244-5248

[31] JunaidahYusof, Farah Adibahbinti Ibrahim, Senin M.S, HilmiahBinti Haji Hassan, MohdNorazmi bin Nordin (2021). Elements of Work Environment In The Construct Of Special Education Teacher Workload In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5284-5288

[32] KhairulHanimPazim, Roslinah Mahmud, Noor FzlindaFabeil, Juliana Langgat, MohdNorazmi bin Nordin (2021). Special Education Teachers Job Satisfaction In Malaysia: A Review. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5329-5332

[33] Mohd Ali Masyhum bin Mohd Nor, Ahmad Faqih Ibrahim, SyahrulAnuar Ali, MohdFairozAffendy bin MdNordin, MohdNorazmi bin Nordin (2021). Elements of Leadership Style In The Leadership Construct Of Special Education Headmasters In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5249-5253

[34] Mohd Ali Masyhum, Ophelia, Masliah Musa, DarainiOyot, MohdNorazmi bin Nordin (2021). Headmasters Leadership On Task Load And Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5294-5299

[35] Mohd Arafat Bin Jaafar, Muhammad TalhahAjmain@Jima'ain, Mazitabinti Ahmad Subaker, KavitaDoraisamy, MohdNorazmi bin Nordin (2021). Special Education Teachers Task Load In Malaysia: A Review. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5333-5337

[36] Mohd Arafat Bin Jaafar, Noor AzlinBinti Abdullah, MohdSabri Bin Jamaludin, Muhamad Amin bin Haji AbGhani, MohdNorazmi bin Nordin (2021). Unique Attitude? The Concept Of Special Education Leadership. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5192-5196

[37] Mohd Noh, A. N., Razzaq, A. R. A., Mustafa, M. Z., **Nordin, M. N**., Ibrahim, B. (2021). Sustainable Community Based Ecotourism Developement. *PalArch's Journal of Archaeology of Egypt / Egyptology*, *17*(9), 5049-5061.

[38] Mohd Noh, A. N., Razzaq, A. R. A., Mustafa, M. Z., **Nordin, M. N.,** Ibrahim, B. (2021). Elements of Community Capacity Building (CCB) For Cbet Development. *PalArch's Journal of Archaeology of Egypt / Egyptology*, *17*(9), 4970-4981.

[39] Mohd Noh, A. N., Razzaq, A. R. A., Mustafa, M. Z., **Nordin, M. N.,** Ibrahim, B. (2021). Future Community-Based Ecotourism (CBET) Development. *PalArch's Journal of Archaeology of Egypt / Egyptology*, *17*(9), 4991-5005.

[40] MohdNorazmi Bin Nordin, Mohamad Zaid Bin Mustafa, Badaruddin Bin Ibrahim, Abdul Rasid Bin Abdul Razzaq, Nor FauziyanaBintiMosbiran (2021). Special Education Unique Leadership Style: The Concept. LINGUISTICA ANTVERPIENSIA, 2021 Issue-1: 2244-2261

[41] Muhamad Amin bin Haji AbGhani, AbidahAqilahBintiMohd Noor, Zulfadli Bin MohdSaad, MohdMazhanTamyis, MohdNorazmi bin Nordin (2021). Improving The Writing Skills Of Jawi Connection Letters Of Students With Learning Disabilities Using The Finger Step. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5307-5312

[42] Mustafa Kamal AmatMisra, NurhanisahSenin, Abdull Rahman Mahmood, JaffaryAwang, MohdNorazmi bin Nordin (2021). Analysis OnAshācirah And Ibādhīyah

On The Attributes Of God. Turkish Journal of Computer and Mathematics Education Vol.12 No.10 (2021), 7661-7673

[43] NazrahBintiJamaludin, KwayEng Hock, EliaBintiMd Zain, NorkhafizahbintiYussuf, MohdNorazmi bin Nordin (2021). This Special Education Is Unique For Teachers, Students, Parents, Leaders And Organizations. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5179-5183

[44] Noel JimbaiBalang, Bong Lie Chien, MimiliaBinti Gabriel, NorHamidahBinti Ibrahim, MohdNorazmi bin Nordin (2021). Elements of Teacher Readiness In The Construct Of Special Education Teacher Workload In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5269-5273

[45] Nor Diana MohdIdris, JunaidahYusof, Fazli Abdul-Hamid, MuhamadHelmySabtu, MohdNorazmi bin Nordin (2021). Formation of Special Education Leadership Study Questionnaire Set That Influences The Task Load And Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5319-5323

[46] Nor FauziyanabintiMosbiran, Ahmad Faqih Ibrahim, Muhammad Yasin Omar Mokhtar, Muhamad Amin bin Haji AbGhani, MohdNorazmi bin Nordin (2021). Elements Of Welfare In Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5264-5268

[47] Nor FauziyanaBintiMosbiran, Mohamad Zaid Bin Mustafa, Badaruddin Bin Ibrahim, Abdul Rasid Bin Abdul Razzaq, MohdNorazmi Bin Nordin (2021). Teacher Competencies To Provide Effective Individual Education Plan For Students With Special Needs Hearing Problems: An Early Review. Turkish Journal of Physiotherapy and Rehabilitation; 32(3): 1617-1621.

[48] Parimala A/P Palanisamy, SantibuanaBintiAbd Rahman, SitiAzuraBintiBahadin, Helvinder Kaur a/p Balbir Singh, MohdNorazmi bin Nordin (2021). Relationship Elements In Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5254-5258

[49] Quah Wei Boon, MohdFairuz Bin Mat Yusoff, NurhanisahBintiHadigunawan, FatinNabilah Wahid, MohdNorazmi bin Nordin (2021). A Review Of The Management Theory For Special Education Task Load Perspective. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5234-5238

[50] RohaniBintiMarasan, Andrew Lim Ming Yew, Dg. Norizah Ag. Kiflee @ Dzulkifli, ColoniusAtang, MohdNorazmi bin Nordin (2021). A Principal's Leadership Excellence Though Disposition of Attributes. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5360-5371

[51] RohanidabintiDaud, ShazaliJohari, Fazli Abdul-Hamid, Syahrul N. Junaini, MohdNorazmi bin Nordin (2021). Face and Content Validity For The Special Education Leadership (Integration) Questionnaire In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5172-5178

[52] RosziNaszariahNasniNaseri, Maryam MohdEsa, NorlelaAbas, NurulZamratulAsyikin Ahmad, RafidahAbdAzis, MohdNorazmi bin Nordin (2021). An Overview Of Online Purchase Intention Of Halal Cosmetic Product: A Perspective From Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.10 (2021), 7674-7681

[53] RosziNaszariahNasniNaseri, NurulZamratulAsyikin Ahmad, SharinaShariff, HarniyatiHussin, MohdNorazmi bin Nordin (2021). Issues And Challenges Of Online Shoppingactivities On The Impact Of Corona Pandemic :A Study On Malaysia Retail

Industry. Turkish Journal of Computer and Mathematics Education Vol.12 No.10 (2021), 7682-7686

[54] SantibuanaBintiAbd Rahman, Helvinder Kaur a/p Balbir Singh, Albert Feisal@Muhd Feisal bin Ismail, SalsuhaidabintiSulaiman, MohdNorazmi bin Nordin (2021). Formation Of Special Education Leadership Study Interview Protocol That Affects The Task Load And Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5313-5318

[55] ShahrulHapizah Musa, EliaBintiMd Zain, MuhdZulkifli Ismail, HifzanBinti Mat Hussin, MohdNorazmi bin Nordin (2021). Something Important For Special Education In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5211-5216

[56] ShahrullizabintiSaharudin, SitiAzuraBintiBahadin, Helvinder Kaur a/p Balbir Singh, ShazaliJohari, MohdNorazmi bin Nordin (2021). The Single Predictor Of The Influence Of Headmasters Leadership On Special Education Teachers Job Satisfaction In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5184-5191

[57] SitiJamilahSamsuddin, Mazidahbinti Ali, Ashari Ismail, MohdSaifulkhair Omar, MohdNorazmi bin Nordin (2021). Elements Of Work Type In The Construct Of Special Education Teacher Workload In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5259-5263

[58] SumaiyahMohd Zaid, NurhananiCheRameli, Aidah Alias, Mohammad Fahmi Abdul Hamid, MohdNorazmi bin Nordin (2021). Virtual Learning Of Deaf Students: We Miss Pupils, We Hate Covid19. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5197-5201

[59] SuzanaBasaruddin, MuhamadHelmySabtu, Azizan Arshad, Irma ShayanaBteSamaden, MohdNorazmi bin Nordin (2021). Elements Of Knowledge In The Leadership Construct Of Special Education Head Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5146-5150

[60] SyahrulAnuar Ali, Khadijah binti Mustapha, Jalila J., Sofia Binti Elias, MohdNorazmi bin Nordin (2021). Financial Elements In Job Satisfaction Of Special Education Teachers In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5229-5233

[61] TumisahbintiAkim, SitiAzuraBintiBahadin, Helvinder Kaur a/p Balbir Singh, Irma ShayanaBteSamaden, MohdNorazmi bin Nordin (2021). Elements Of Qualification In The Leadership Construct Of Special Education Headmasters In Malaysia. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5135-5140

[62] Zarina Osman, SyahrulAnuar Ali, SalwatibintiSu@Hassan, Kothai malar Nadaraja, MohdNorazmi bin Nordin (2021). Special Education Leadership In Malaysia: A Review. Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 5324-5328