

A Framework of Inclusive Education for Vice Chancellors of Universities Based On the Goals of Sustainable Development through Visual Digital Dashboard

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1. INTRODUCTION

Education is a practice of transfer the knowledge and skills to students. Inclusion in education provides equivalent openings to all the students (including students with disabilities) towards education and learning, where every student should be treated fairly within the educational environment. Inclusion refers towards understanding, admitting, and dealing all students at equal levels without any segregation of physical, intellectual, educational, social or emotive abilities or disabilities.

The General Assembly of United Nations Member States had accepted the agenda of 17 Sustainable Development Goals (SDGs) for 2030, focusing on “leaving no one behind”. These SDGs clearly include disability and people with disabilities. Disability is directly counted in the following goals of SDGs: 4, 8, 10, 11 and 17. It is an immediate appeal for all the countries around the world to act on these SDGs.

Vice Chancellors/presidents/heads of the universities can play a significant role towards inclusion at the tertiary level of education for disable students, through the provision of support for the first two goals (4 and 8), as mentioned above. Vice chancellors can help special need students (students with disabilities) through the provision of inclusive learning environments, innovations in curriculum, involvement of parents and other key stakeholders, and contacting the industries and experts to help disable individuals in getting access to the job market. This paper provides a framework of inclusive education for vice chancellors to implement these two goals at their universities through the help of visual digital dashboard of decision making, based on the revision(s) of policy (policies) or/and linked procedure(s).

INTRODUCTION.....CONTINUED

Business intelligence (BI) software works on a systematic structure to collect, save and analyze the data of an organization [1]. Effective decision making depends on appropriate organization of data. BI software is utilized in diverse areas such as commerce, industry, medical and education; it saves, recalls, organizes, searches and compares the data and offers a dashboard that creates reports, charts, queries and gives many other options for making decisions. Oracle and NetSuite are famous companies those are proving comprehensive business solutions for pedagogical organizations.

Nevertheless, available literature reveals that the percentage of success for business intelligence solutions are very little [2], expensive and need a huge amount of time for its implementation [3]. In addition, BI systems do not offer needed actions for upcoming necessities those move towards constant advancements [4]. Inclusive education needs constant improvements, revisions and effective decisions making for its implementation at the best.

Therefore, solutions are required towards the invention of operative and operational developments for the real-world atmospheres of pedagogical institutions, focusing on inclusive education those move towards effective decision making with focused and organized actions, considering the upcoming needs of institutions, devoid of business intelligence systems.

This paper emphasizes on the course of effective decision making by the use of an offered framework for inclusive education that is centered on revision(s) of policy (policies) or/and procedures(s), connected with inclusive education, planned to meet the sustainable development goals, including disability and people with disabilities; focusing on “leaving no one behind” announced by the General Assembly of United Nations Member States.

2. LITERATURE REVIEW

2.1. General Assembly of United Nations Member States

The General Assembly of United Nations was established in 1945 under the Charter of the United Nations that has a significant role in policymaking, including all members of United Nations; it offers an exclusive forum for multilateral debate and conversations covering complete spectrum of world-wide problems [5].

2.2. Sustainable Development Goals by General Assembly of United Nations Member States

The agenda for 2030 goals of sustainable development accepted by United Nations Member States offers a plan for peace and prosperity for the human beings living on earth, keeping in view the existing situation and upcoming needs at global levels. In addition, all the countries around the globe are requested to participate immediately and eliminate poverty and other deficiencies through effective plans and policies towards the improvement of health and educational facilities and to decrease inequalities [6].

2.3. 17 Sustainable Development Goals – “Leaving no one behind”

The General Assembly of United Nations Member States had acknowledged the agenda based on 17 Sustainable Development Goals (SDGs) for 2030, concentrating on “leaving no one behind”. These SDGs visibly comprise disability and persons with disabilities. Disability is openly focused in the goals of SDGs, including: 4, 8, 10, 11 and 17 [7].

2.4. Goals 4 and 8 of Sustainable Development by General Assembly of United Nations

Goal 4 is linked to effective and inclusive learning atmospheres for inclusive education (including people with disabilities), without gender differences and focusing towards lifelong learning [7].

Goal 8 is connected to inclusive and sustainable economic growth (including people with disabilities), with equal and decent work opportunities without gender differences [7].

2.5. Data and Intelligence

Facts collected for evaluations and conclusions are called data [8]. Well-organized and arranged data is information [9]. When the information is properly organized and implicitly retained by a person is known as knowledge; in addition, knowledge is recognised facts gained by experience, involvement, training or workout [10, 11].

2.6. What is Decision Support and Business Intelligence (BI)?

The idea of business intelligence came from a technology named decision support in 1950 [12]. Business intelligence supports companies and corporations to analyse and evaluate commercial based information that results in effective decision making [13, 14]. BI permits to store huge amount of information, deal with unstructured and structured data and delivers improved outcomes those lead towards decision making [1].

Conversely, [3] states that the cost of implementation and execution of a business intelligence system is very high and utilizes a huge amount of time, moreover, data mining and other technological expertise need trainings, and subcontracting to a third party could be required such as the involvement of specialists. 'Gartner' a technological research firm states that successful rate of business intelligence software is between 20% to 30% [2].

2.7. Business Intelligence Data Dashboard

A business intelligence software data dashboard is used to analyse, evaluate and track the key performance indicators by the executives and administrators of an institution that helps them in making decisions; hence, a power BI dashboard shows substantial decision making particulars [15]. Crystal reports, Tableau, Power BI and Jasper reports are famous tool those are used for data visualisation and generates reports for the institutions, resulting in charts, graphs, reports, flow charts and other options through visual digital dashboard [16]. An isolated set of data which is difficult to fetch, integrate and utilize with other data sources of an institution is known as a data silo [17]. These computer based tools can interact with data silos and restructure the data to get connected with diverse data sources; such as Tableau tool could be linked to variety of data sources like MS Excel and comma-separated value files, relational databases like SQL Server, DB2, Oracle, and Google Cloud, Sheets and many other sources [18].

2.8. What is a Report?

A computer generated report is comprehensive information illustrated in diverse provisions like graphs, charts or information in tabular form [19].

2.9. Machine Learning?

A method that utilizes algorithms to analyse and compare the existing information towards upcoming forecasts and projections is called machine learning [20].

2.10. Pedagogical System and its Stakeholders

Key stakeholders of a pedagogical system are staff (teachers and administration), students, policy makers, heads of educational institutions, parents, researchers, alumni, related industries and experts linked to the concerned institutions [16].

2.11. Policies and Procedures

A policy is a set of rules and principles for an act sanctioned by an authority that is required to be shadowed by related stakeholders; moreover, it interprets any questions related to stakeholders, what and why they have to do [21]. A procedure is a method or practice that tells how a policy is followed by shadowing steps in a detailed manner [21]. Policies and procedures help towards the delivery of guidelines, steps and ways to complete diverse operations and ensure compliance with indicated laws concerning decision making and reorganisation of internal operations [21].

If a policy does not deliver projected results of advancement then it is the time to revise the policy or linked procedure(s); this reevaluation comes up with enhanced outcomes that supports in effective decision making [22].

2.12. What is Inclusive Education?

Inclusive education is connected with the activities accomplished in formal pedagogical organizations including usual and special needs students within the similar atmosphere those enhance the collaboration and communication of these students [23]. Inclusive education is a practice that allows students with special needs or disabilities to obtain their education along with formal students within formal classrooms those are reinforced by support services [24].

2.13. Key Performance Indicators (KPIs) Essential for a University towards Performance Comparison and Improvement of Performance Ranking at Global Level

Key performance indicators are the foundations of decision making. In general, there is a long list of KPIs that is utilized to evaluate the performance of a university; nevertheless, there are following most important KPIs those are vital for performance evaluations [25]:

i). Achievement of students. ii). Discipline referrals. iii). Percentage of attendance in the classrooms. iv). Students graduation percentage. v). Teachers satisfaction.

The Times Higher Education (THE) annually publishes the rankings of universities in the world. Following are some of the KPIs used by THE for the announcement of international rankings of the universities [26] (indicators those can be linked to inclusive education are selected and listed here):

Teaching and learning: 1). Staff to student ratio. ii). Number of full time enrolled students. iii). Male to female student ratio. iv). **Research:** productivity (published papers per researcher). v). Citations per paper. **Industry:** vi). Information related to industry (knowledge transfer etc.). ‘California Institute of Technology’ bagged fourth place (with an overall score of: 94.5) according to the World University Ranking of THE for 2021 [27], and moved two places up to second place (with an overall score of 95.0) in 2022 [28] using above mentioned KPIs.

The QS world university rankings for Arab and other areas consider following KPIS [29] (indicators those can be linked to inclusive education are selected and listed here):

i). Citations/paper. ii). Ranking of programs (Academic Reputation). iii). International Research Network.

Some of the helpful KPIs those are considered under common knowledge and required by any university (higher education institution) for performance evaluation and improvement of rankings are taken from the author [16] and merged with the KPIs of ‘THE’ and ‘QS world university ranking’, keeping in view inclusive education and listed in figure 3 at the left side, under KPIs.

3. Independent, Dependent and Moderating Variables of the Framework for Inclusive Education

Following figure 1 shows independent, dependent and moderating variables of the Framework for Inclusive Education at the university.

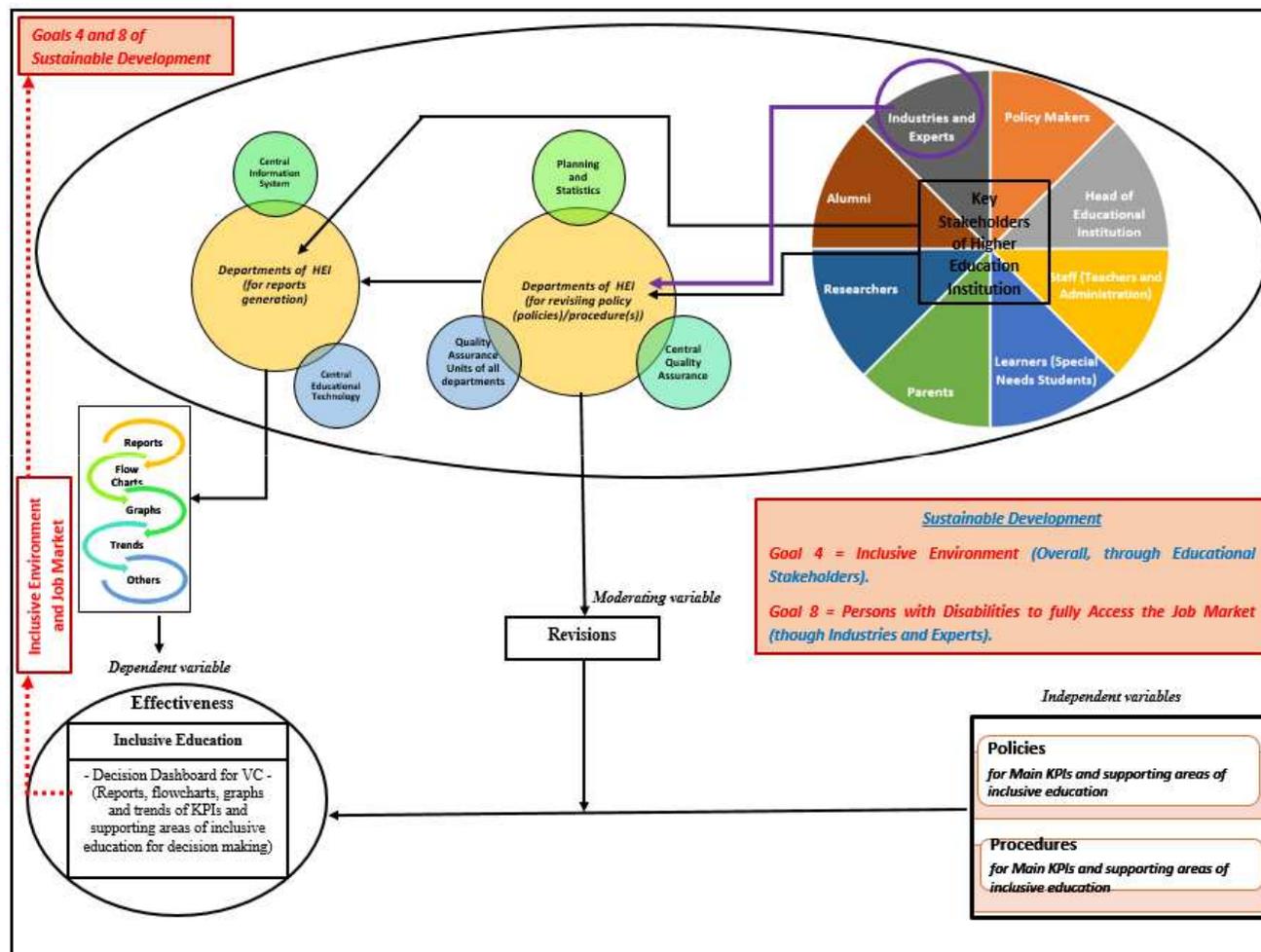


Figure 1. Independent, Dependent and Moderating Variables of the Framework for Inclusive Education at the University

4. Framework of Inclusive Education (for Goals 4 and 8 of UN's General Assembly for Sustainable Development)

The independent, dependent and moderating variables shown in figure 1 on the previous slide illustrates the relationship of these variables within in the framework of inclusive education at the university, keeping in view the two goals (4 and 8) of sustainable development. On the next slide (figure 2), the departments of 'planning and statistics', 'central quality assurance', 'central information system', 'educational technology': dealing with a LMS, 'industry and experts': as main key stakeholders and 'quality assurance units' of all the departments in the university are highlighted with blue color, those play a vital role for the framework of inclusive education that is a repeated process of revision(s) for policy (policies) or/and linked procedure(s) towards the assessments of KPIs (figure 3, left side) related to effective decision making for performance enhancements, until expected outcomes are achieved. All the other colors with dotted and dashed lines and arrows in figure 2 are used to show inner links among diverse departments of the university; the basic source of this structure (figure 2) is adopted from the author [16].

There are many tabs on the framework of inclusive education (figure 2) under the "Dashboard for the VC/Head/President/ of the HEI for Decision Making on Inclusive Education". All the tabs have comprehensive details of KPIs at the left side of figure 3, those would produce graphs, charts, trends, comparison tables and others through the offered visual digital dashboard to the vice chancellor for effective decision making.

There are two type of policies used by any university; one type is developed by the policy makers for implementation and second type is developed by the university, itself. Every policy has a procedure or set of procedures. Policy (policies) and procedure(s) could be revised keeping in view the outcomes of KPIs achieved through the digital dashboard of decision making, until the expected outcomes get achieved. A vice chancellor can make decisions and send recommendations to the policy makers to revise a policy or request linked stakeholders to revise the policy or/and linked procedure(s) until the required outcome is not achieved. The structure of this framework is based on standard names; any university can include the names of its departments and adopt internal structure based on its in-house arrangement.

Framework of Inclusive Education (Goals 4 and 8 of UN's General Assembly for Sustainable Development)

Following figure 2 illustrates the framework of Inclusive Education (for the Goals 4 and 8 of UN's General Assembly for Sustainable Development).

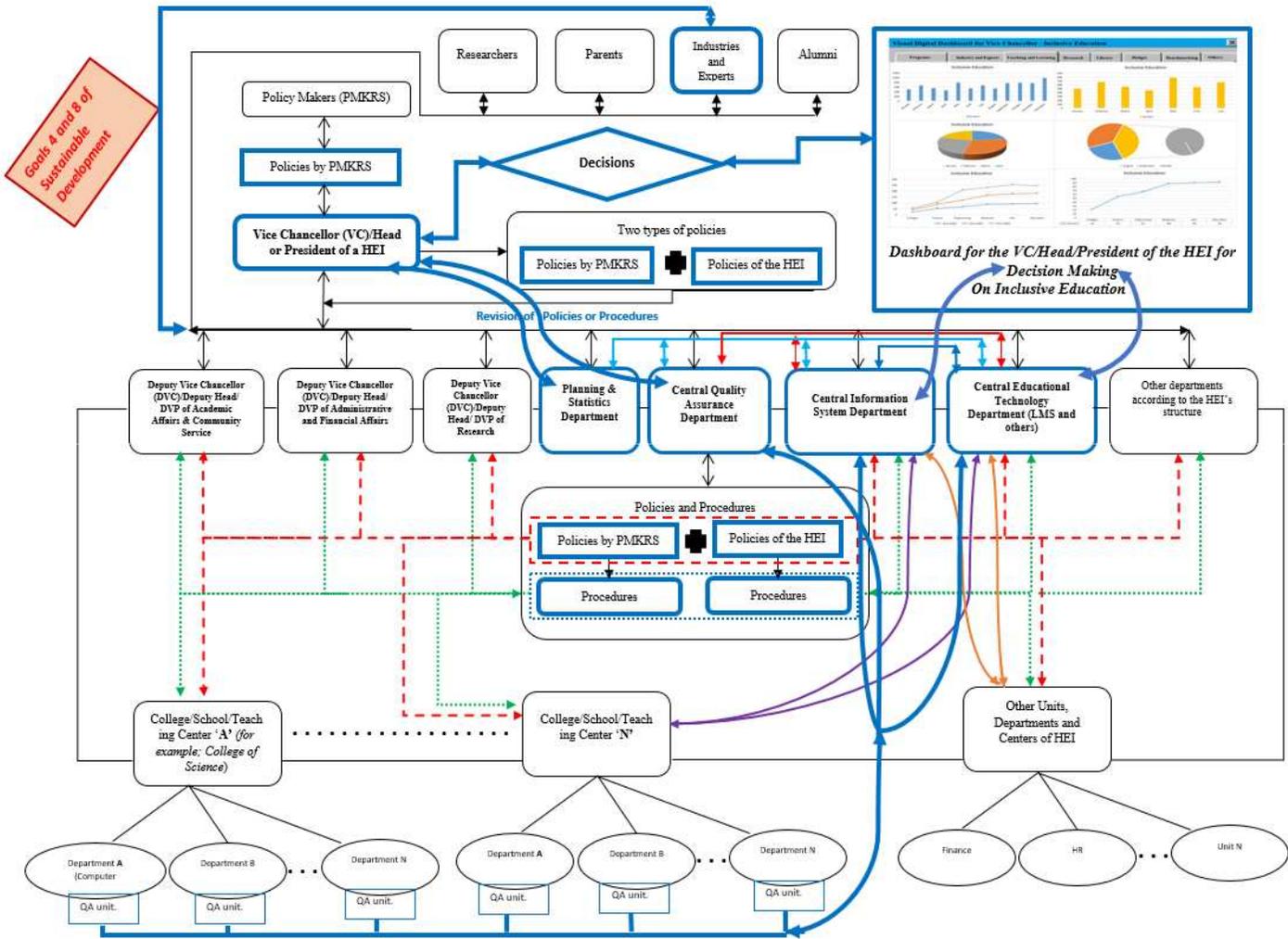


Figure 2. Framework of Inclusive Education (Goals 4 and 8 of UN's General Assembly for Sustainable Development)

Figure 3 shows the details of visual digital dashboard for inclusive education, given in figure 2.

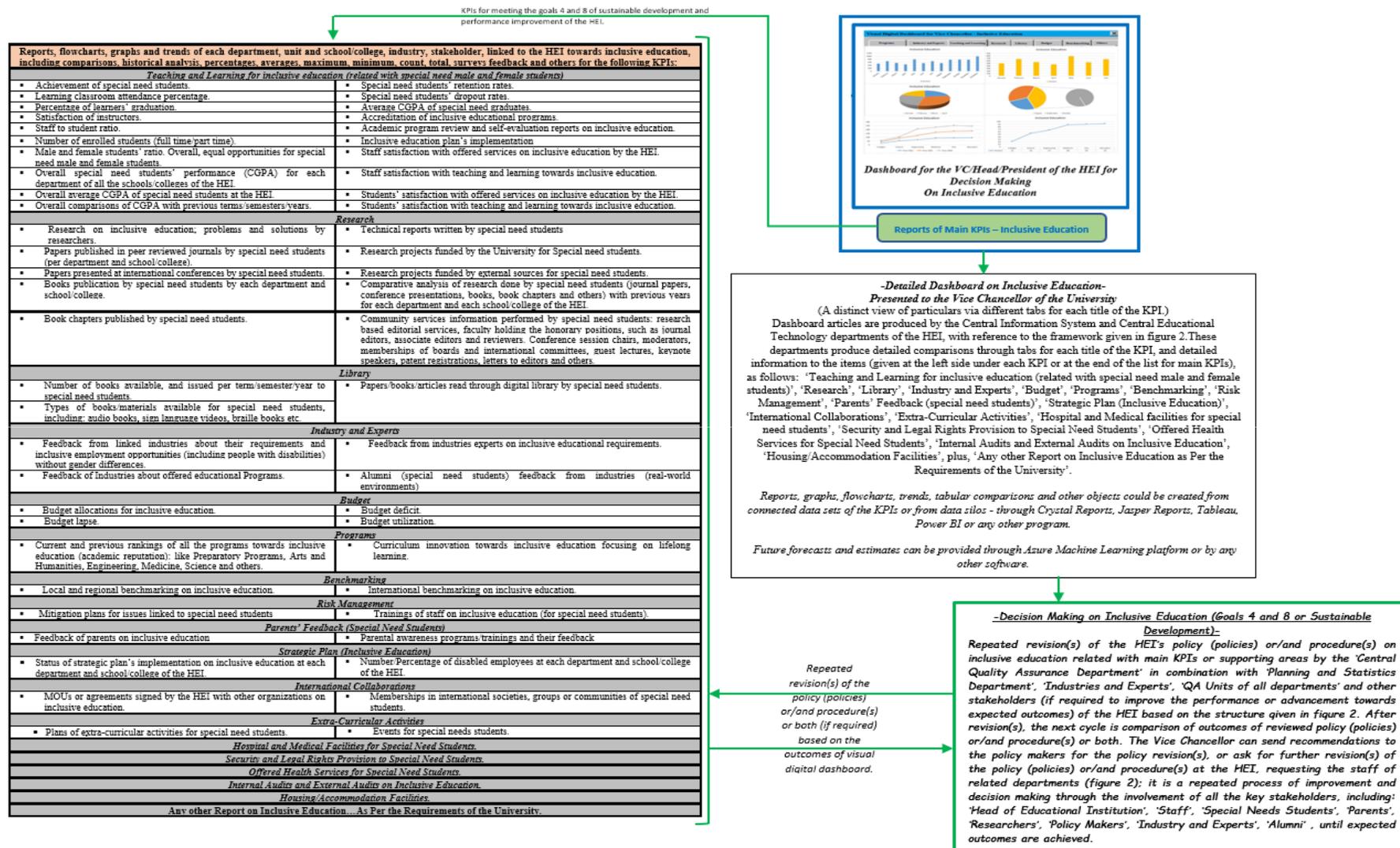


Figure 3. Details of Visual Digital Dashboard for Inclusive Education shown in figure 2

5. Conclusions and Future Work

The practice of education is centered on transfer of knowledge and skills to the students. Inclusive education refers to the inclusion of students with disabilities along with other students in formal classrooms. The General Assembly of United Nations Member States had acknowledged the agenda based on 17 goals of sustainable development for 2030 that emphasizes on “leaving no one behind”. These SDGs particularly include people with disabilities, and dealing with disability is directly considered in goals: 4, 8, 10, 11 and 17. They have requested all the countries around the world to immediately act on all the SDGs.

Educational institutions of all levels can play an important role towards this call; vice chancellors/presidents/heads of universities can play a substantial role towards the inclusion at tertiary level of education for students with disabilities, and contribute to first two goals; 4 and 8. Goal 4 is associated with effective and inclusive learning environments via inclusive education that includes students with disabilities, without any gender differences (including male and female students with disabilities) aiming towards lifelong learning strategies. Goal 8 is linked to inclusive and sustainable economic growth (counting persons with disabilities) with parallel and decent working provisions without any gender discrimination.

The success rate of business intelligence software is very low, implementation is time consuming and price is very high; moreover, human involvement and intelligence is required towards successful accomplishments of required outcomes. Therefore, there is a need to solve these issues with successful outcomes; this framework of inclusive education is a solution of these problems.

Conclusions and Future Work...continued

Vice chancellors can use the offered framework of inclusive education in this paper to support students with disabilities (special need students) through inclusive educational environments without any gender discrimination. There is a list of key performance indicators, given in figure 3 of this paper that can be used to generate reports and implement inclusive environments. VCs are offered with the digital dashboard of decision making by the central information system and central educational technology departments of the university that is based on the revision of policy (policies) or/and linked procedure(s) with any KPI, until the expected outcomes are achieved. Central quality assurance department, quality assurance units of all the departments at the university, planning and statistics department are other key departments playing the role in the implementation of inclusive education. Moreover, VCs can use staff, pedagogical stakeholders and resources at the universities to contact the linked industries, alumni and experts related to HEI's specialization, those could help in drawing a clear picture of the future requirements for the students including students with disabilities with reference to the job market; as a result, inclusion will come up with effective inclusive environments at the university, along with constructive future outcomes those will help normal students and students with disabilities to get decent jobs in the industry without gender discrimination.

Dear vice chancellors/heads/presidents of universities, what are you waiting for? The framework of inclusive education is in your hands. Use this framework to help the students with disabilities at your universities, improve the overall performance through effective decision making, and answer the call of the General Assembly of United Nations through accomplishing the goals 4 and 8 of sustainable development; and change this world.

6. References

- [1]. Grublješič, T., & Jaklič, J. (2015). Conceptualization of the business intelligence extended use model. *Journal of Computer Information Systems*, 55(3), 72–82.
- [2]. Goundar, S. (2021). *Enterprise Systems and Technological Convergence, Research and Practice*, Information Age Publishing Inc. USA.
- [3]. Salur, M. & Kattar, W. (2021). The Pros and Cons of Business Intelligence Applications in Auditing, *Journal of Social Sciences of Mus Alparslan University anemone, Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, 9(2), 553-559.
- [4]. Mrc. (2017). 7 common problems that lead to BI failure, URL: <https://www.mrc-productivity.com/blog/2017/04/7-common-problems-that-lead-to-bi-failure/>
- [5]. United Nations, (n.d.). General Assembly of United Nations, Functions and powers of the General Assembly, URL: <https://www.un.org/en/ga/about/background.shtml#:~:text=Comprised%20of%20all%20193%20Members,issues%20covered%20by%20the%20Charter.>
- [6]. “THE 17 GOALS | Sustainable Development.” *THE 17 GOALS | Sustainable Development*, URL: sdgs.un.org/goals.
- [7]. SDGs, (n.d.). Sustainable Development Goals (SDGs) and Disability. United Nations. URL: <https://www.un.org/development/desa/disabilities/about-us/sustainable-development-goals-sdgs-and-disability.html>
- [8]. Zafar, A. (2021). *Salesforce Data Architecture and Management*, Packt Publishing Ltd. UK.
- [9]. Miller, J.P. (2000). *Millennium Intelligence: Understanding and Conducting Competitive Intelligence in the Digital Age*. Medford, NJ: Information Today, Inc.
- [10]. Collins, H. (2012). *Tacit and Explicit Knowledge*, University Of Chicago Press; Reprint edition 2012.
- [11]. Cláudio, R. R., Liane, M. K., Rejane, F., & Bruna, B.M. (2015). Methodology for acquisition of collective tacit knowledge used in diagnosis of defect cause in industrial processes, *VINE*, 45, 22 – 45.
- [12]. Heang, R., & Mohan, R. (2017). Literature review of business intelligence. School of Business and Engineering, Halmstad University, Sweden. URL: <https://www.divaportal.org/smash/get/diva2:1080911/FULLTEXT01.pdf>

References.....Continued

- [13]. Sadiku, M. N. O & Musa S. M. (2021). A Primer on Multiple Intelligences, Publisher Springer Nature Switzerland AG 2021, ISBN 978-3-030-77584-1, <https://doi.org/10.1007/978-3-030-77584-1>
- [14]. Ghoshal, S., & Kim, S. (1986). Building effective intelligence systems for competitive advantage. *Sloan Management Review*, 28(1), 49-58.
- [15]. Sahin, M. & Ifenthaler, D. (2021). Visualizations and Dashboards for Learning Analytics, *Advances in Analytics for Learning and Teaching*, Publisher Springer Nature Switzerland AG 2021, ISSN 2662-2130, <https://doi.org/10.1007/978-3-030-81222-5>
- [16]. Ahmad, N. (2022). A Framework for Vice Chancellors to Increase the International Rankings of Universities through Effective Decision Making Based on KPIs via Visual Digital Dashboard. *Egyptian Computer Science Journal* 46(2), 12-26, ISSN-1110-2586.
- [17]. Patel, J. (2019). Bridging Data Silos Using Big Data Integration, *International Journal of Database Management Systems (IJDMS)* . 2(3), 1-6.
- [18]. Tableau. (n.d.). Tableau Data Sources, URL: <https://www.cloudduggu.com/tableau/data-source/#:~:text=Tableau%20BI%20tool%20is%20capable%20of%20connecting%20to,such%20as%20ODBC%20connection.%20Tableau%20Data%20Sources%20List>
- [19]. Pdamkar, P. (n.d.). Power BI Dashboard vs Report, URL: <https://www.educba.com/power-bi-dashboard-vs-report/>
- [20]. Abozraig, M., Ok, B. & Yildiz, A. (2022). Determination of shear strength of coarse-grained soils based on their index properties: a comparison between different statistical approaches. *Arabian Journal of Geosciences* 15, 593. <https://doi.org/10.1007/s12517-022-09875-w>
- [21]. Peltier. (2004). *Information Security Policies and Procedures: A Practitioner's Reference*, Second Edition, CRC Press.
- [22]. Compliancebridge. (2021). What to Consider During the Policy and Procedure Review Process, URL: <https://compliancebridge.com/policy-and-procedure-review-process/>

References.....Continued

- [23]. Moran, A. & Abbott, L. (2002). Developing inclusive schools: the pivotal role of teaching assistants in promoting inclusion in special and mainstream schools in Northern Ireland. *Euro Journal of Special Needs Education*, 17(2), 161-172.
- [24]. De Boer, A. A., Pijl, S. J. & Minnaert, A. E. M. G. (2010). Attitudes of parents towards inclusive education: A review of literature. *European Journal of Special Needs Education*, 25(2), 165-181.
- [25]. Emery, D. (2014). 5 key indicators of school performance, URL: <https://flippengroup.com/5-key-indicators-school-performance-2/>
- [26]. The. (2022). World University Rankings 2022: methodology, URL: <https://www.timeshighereducation.com/world-university-rankings/world-university-rankings-2022-methodology>
- [27]. The. (2021). Times Higher Education, World University Rankings 2021, URL: <https://www.timeshighereducation.com/world-university-rankings/2021/world-ranking>
- [28]. The. (2022). Times Higher Education, World University Rankings 2022, URL: <https://www.timeshighereducation.com/world-university-rankings/2022>
- [29]. QS, (2022). Top Universities. QS Arab Region University Rankings 2022, URL: <https://www.topuniversities.com/university-rankings/arab-region-university-rankings/2022>

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