DEFINING THE INFORMATION REQUIREMENTS TO BUSINESS INTELLIGENCE DASHBOARD FOR ACADEMIC PROGRAMME MANAGEMENT: A CASE STUDY FROM THE OPEN UNIVERSITY OF SRI LANKA

Janaha Selvaras[1], Manoshika Sathiyavel[2]

[1] Department of Legal Studies, Faculty of Humanities and Social Sciences, The Open University of Sri Lanka (Sri Lanka)

[2] Department of Human Resource Management, Faculty of Management Studies, The Open University of Sri Lanka (Sri Lanka)

ABSTRACT

Despite the growth of data, academic departments in universities are concerned about lack of insight into academic program delivery progress. Academia requires insights to execute proactive measures to ensure the successful delivery of Programme and courses. This dearth of insights is mostly due to a lack of reporting mechanisms that provide a quick glimpse of progress and real-time surveillance. In order to, address this problem, the authors drew on the sense making theory, confirming the previous theorizations by proposing the business intelligence dashboard as a tool which assist in insight extraction throughout the sense making process and in decision making about academic program delivery management. A business intelligence dashboard is one such reporting tool that provides snapshots of real time progress. Consequently, this contributes to confirm the current understanding on tools of sense making and more importantly provides academics with a prototype dashboard they can utilize to get insights for their decision on academic programme delivery management. Despite its significance for academic program delivery management, business intelligence dashboards are overlooked in Asian, primarily in Sri Lankan higher education context. Therefore, the question of what information should a business intelligence dashboard for academic program delivery management contain, to provide related insights to academia, remains unanswered. Consequently, in order to, address this question, this study was conducted focusing on the academic programme management of MBA in HRM to identify the information requirements to develop a prototype of a business intelligence dashboard to provide insights. In this endeavor, this study adopts a positivist philosophical lens and design science research approach and follows action-research project strategy. Correspondingly, an iterative research method is proposed based on the existing Cross-Industry Standard Process for Data Mining. The limited focus of this study opens for new avenue in studying the business intelligence tools' requirements for an individual or another academic programme. Further, future study could focus on implementation of this dashboards. In addition, this case study from the open university of Sri Lanka, will provide insight into the identification of requirements and the

implementation of business intelligence dashboards for institutions offering similar academic programmes.

Keywords: *Business Intelligence Dashboard, Academic Programme Management, Programme Delivery, The Open University of Sri Lanka.*

1. INTRODUCTION

As the famous philanthropist Eric Lefkofsky quotes, we live in the era of big data and even bigger analytics; we live in the era of insight. There is a significant relationship between data driven insights and; existence and survival of any field in this era of globalization, which is the age of interaction and integration among people. The need of data driven insights are required in the field of higher education as the academic programmes are managed with the input of data and an efficient analysis of the data to perform decision making in terms of implementation of academic delivery (Wyne, Reeves, & Gurbach, 2015). There is a set of bodies in universities to monitor, evaluate and measure its academic delivery and they contribute in decision making with the predominant assistance of technology to analyse data. This article intends to present this research focusing on the need of data driven insights for academic programme management. Academic programme management in higher education requires appropriate and prompt academic reports to make decisions to implement and improve the quality of academic delivery (Destiandi & Hermawan, 2018). However, significantly visible problem is that there is no or less assistance of technology involved in the growing need of data driven insights of academic programme management. Hence, this research highlights that a real time reports with bird eye view are crucial to provide insights about academic programme management (Wyne et al.,2015). To propose a viable solution for this existing lacuna, researchers have sought out the sense making theory which explains that sense making requires ongoing retrospection of past and extraction of meaningful cue from the environment (Strenger, as cited in Namavar & Cybulski, 2014, p.1; Weick et al., as cited in Namavar & Cybulski, 2014, p.1). Accordingly, sense making theory which is a way of understanding an organization to make decision, recommends Business Intelligence (BI) Dashboard as a tool which will assist in extraction of meaningful cues from the environment and provide data driven insights for decision making (Namavar & Cybulski, 2014, p.1).

BI, being a management term, generally used to describe the applications and the technologies that are involved in gathering, transforming, and analysing data in business in order to provide better decision-making process and dashboard is a BI reporting tool (Destiandi & Hermawan, 2018). Thus, BI dashboard as a tool popularly used to integrate and analyse data to generate insights for present quick, comprehensible overviews of the institution's status and direction (Schneider, 2007). In this context, the proposal for application of BI dash boards for academic management programme is not novel as it has been already discussed and implemented at many universities from different global jurisdictions. Therefore, there is an established academic literature to justify the application of BI dashboards in academic programme management and this article is not another contribution on this regard. On contrast, this article is a case study of defining the information requirements for BI dashboard of academic programme management. It is to be

noted that a successful implementation of BI dashboard depends on the proper identification of requirements as it enables the relevant data visualization.

This case study was carried out on the academic progremme of MBA in HRM at the Open University of Sri Lanka (OUSL) for the academic year 2020/2021. Being a pioneer in imparting the academic delivery through open and distance learning, the Open University of Sri Lanka differs from conventional universities not only in terms of its mode of academic delivery, but also in terms of a university teacher's role and responsibilities. The course development and academic coordination are significant duties for OUSL teachers. Currently, there is no technological tool directly applied to carry out the academic management programme at OUSL and it is carried out manually by the OUSL teachers. The researchers believe that the case study is highly relevant and significant as the requirements identified for a BI dashboard to academic management can be employed by the OUSL and similar institutions to design a dashboard to enable real time insights in this regard.

Against this introduction, the following objective was pursued; to identify the information requirement of a BI dashboard for academic programme delivery management, of an academic department. This study sought to achieve the following research aims.

-to identify the information requirement of a BI dashboard for academic programme delivery management

-to prepare a BI dashboard prototype for academic programme delivery management, for an academic department

There is substantial academic literature on the application of BI dashboard in higher education, which covers the identification of requirements for BI dashboard. This study will add to the literature on what requirements are identified in a higher education institute functioned through ODL and will be a new contribution to the documentation from Sri Lanka. Part I introduces the title of this research while Part II describes the research method. Part III discusses the identification and applicability of requirements for BI dashboards to academic programme management. In the end, this paper suggests requirements for business intelligence dashboards and presents a prototype. In addition, preparation of comprehensive dashboard and deployment of BI dashboards for academic programme management areas are identified for future research.

2.   METHODOLOGY

This study will adopt a positivist philosophical lens (Wayne, 2010, p.7) and the design science research approach (Iriberri & Stengel, 2021). To this end, the present study will follow action- research project strategy (O'Meara et al., 2020, p.35), in which the focus of project will be confined to the postgraduate programme in the academic department of human resource management, attached to faculty of management studies in The Open University of Sri Lanka. Correspondingly, an iterative research method is proposed based on the existing Cross-Industry Standard Process for Data Mining (CRISP-DM) (Wah, Suiying & Shuangjie, 2019, p.321). Fig 1 shows the CRISP-DM Model.

Figure 1.

Cross-Industry Standard Process for Data Mining Model.
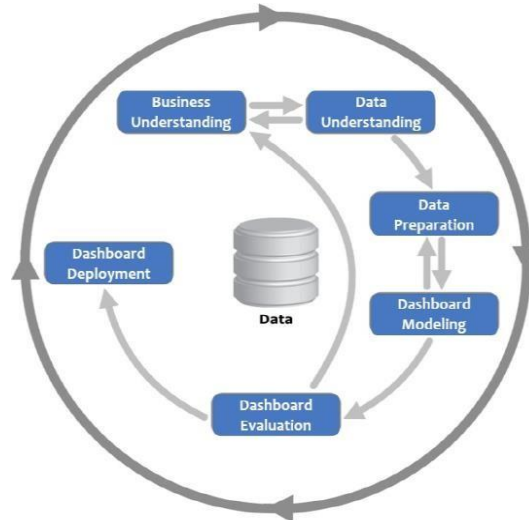
CRISP-DM was adopted for this study. Accordingly, the research process began with the user requirement analysis relating to postgraduate program and its management. At this stage, data was gathered using primary and secondary sources. Furthermore, primary data was collected through interview of four staff who were involved in management of the selected programme. Following that, the requirements for business intelligence dashboards was determined based on a thematic analysis of interview data. In addition, secondary data was collected from Bylaws and student guidebook. Subsequently, the required data to present were understood and prepared. Then, data requirements were specified only for sample themes (Grand academic plan progress task wise and Day school progress course wise) chosen for prototype dashboard. In this case, number of day schools completed was decided as indicator to be presented under day school progress. In addition, plan and actual comparison task wise (with pending indication) was decided as indicator to be presented under progress against grand academic plan. Further, data sources were identified, extracted, verified, and tabulated. Moreover, following the data preparation, the prototype dashboard modelling was carried out, using Microsoft Excel. In order to visualize the grand academic plan progress and day school progress respectively Gantt chart with plan actual comparison and Pie chart with progress indication were chosen as visualization techniques. The literature review was performed throughout the study.

3. FINDINGS AND DISCUSSION

This part includes the discussion on identification of requirements for BI dashboards and prototype dashboard for academic programme management.

a. Identification of Requirements for BI Dashboards to Academic Programme Management
The requirements for BI dashboard to academic management programme was gathered through structured interviews with the selected academics who are immediate stakeholders in the decision-making process. The identification was processed in the light of the opinions described for pre-determined questions through thematic analysis. Table 1 shows the predetermined questions of the interview and the general requirements and sub requirements generated from the responses of participants.

Table 1.

Predetermined interview questions, general requirements, and sub requirements.

Pre-determined Questions	Generated Requirements	Sub Requirements
What decision you make relating to MBA in HRM programme? What insight you require in making decision regarding MBA in HRM academic Programme management?	*Academic Delivery*	• *Grand academic schedule tracker* • *List of in progress activities (Daily, weekly, and monthly)* • *Day school progress course wise* • *Assessment progress course wise* • *Profile of academic panel*
	Budget	• *Budget and variance analysis* • *Payment tracker*
	Learner support	• *Registration status batchwise and course wise* • *Course completion list* • *Moodle access percentage course wise* • *Student complaint tracker*
	Support Service	• *Moodle account creation status*

Pre-determined Questions	Generated Requirements	Sub Requirements
	Policy Documents	● *Bylaw link and summary* ● *MOU link and summary*

b. Prototype Dashboard for Academic Programme Management

The study attempted to prepare a prototype dashboard showing the progress status against grand academic plan and days school progress, which were elements of academic delivery.

Figure 2.

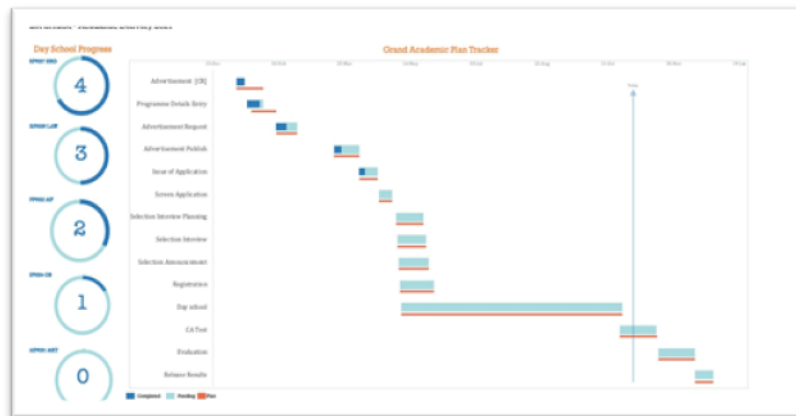*Dashboard showing progress status against grand academic plan and days school progress*

Fig 2 shows the dashboard prototype showing progress status against grand academic plan and days school progress. These main and sub themes were identified (which shows requirements) in the data collection process. Subsequently, the relevant indicators and data requirement were determined. Then the relevant data was collected and prepared. Following that the visualization of indicators were determined. According to the Fig 2, number of day schools completed course wise is shown under day school progress, using a Pie chart with progress indication. Further, plan versus actual comparison task wise (with pending indication) is shown in progress against grand academic plan.

4. CONCLUSION

Above mentioned search has been carried out to identify the information requirement of a BI dashboard for academic programme delivery management and to prepare a BI dashboard prototype for academic programme delivery management, for an academic department. According to the thematic analysis employed on the data gathered from the selected academics of MBA in HRM programme, this study identify progress on adamic delivery, progress against budget, progress on learner support, progress on support service and policy documents as the key requirements for business intelligence dashboards of academic programme management at OUSL. In addition, this paper also includes a BI dashboard prototype for two identified requirements. Given that the purpose of this study is to describe the requirements for business intelligence dashboards, the modelling and deployment of such business intelligence dashboards are areas for future research.

5. REFERENCES

Destiandi, N., & Hermawan, A. (2018). Business Intelligent Method For Academic Dashboard.

Bit-Tech, *1*(2), 11–20. https://doi.org/10.32877/bt.v1i2.42

Gregory, R. W. (2010, January). Design Science Research and the Grounded Theory Method: Characteristics, Differences, and Complementary Uses. *Theory-Guided Modeling and Empiricism in Information Systems Research*, 111–127. https://doi.org/10.1007/978-3- 7908-2781-1_6

Iriberri, A., & Stengel, N. D. (2021). Closing the Loop: Development of a Dashboard for Quality Improvement of Business Education Programs. *International Journal for Business Education*, *161*, 23–38. https://www.researchgate.net/publication/351513448_Closing_the_Loop_De velopment_ of_a_Dashboard_for_Quality_Improvement_of_Business_Education_Progra ms_-_-_International_Journal_of_Business_Education_2164- 2885_and_2164-2877

Koesten, L., Gregory, K., Groth, P., & Simperl, E. (2021). Talking datasets – Understanding data sensemaking behaviors. *International Journal of Human-Computer Studies*, *146*, 102562. https://doi.org/10.1016/j.ijhcs.2020.102562

O'Meara, K., Beise, E., Culpepper, D., Misra, J., & Jaeger, A. (2020). Faculty Work Activity Dashboards: A Strategy to Increase Transparency. *Change: The Magazine of Higher Learning*, *52*(3), 34–42. https://doi.org/10.1080/00091383.2020.1745579

Valks, B., Arkesteijn, M., Koutamanis, A., & den Heijer, A. (2021). Towards Smart Campus Management: Defining Information Requirements for Decision Making through Dashboard Design. *Buildings*, *11*(5), 201. https://doi.org/10.3390/buildings11050201

Wah, T. Y., Suiying, T., & Shuangjie, A. L. (2019). Dashboards for Decision Making

in Higher Education. *Personalised Learning. Diverse Goals. One Heart.*, 321–329. https://2019conference.ascilite.org/assets/papers/Paper-054.pdf

Wixom, B., & Watson, H. (2010). The BI-Based Organization. *International Journal of Business Intelligence Research*, *1*(1), 13–28. https://doi.org/10.4018/jbir.2010071702

Wyne, M., Reeves, J., Montes, F., & Gurbach, T. (2015, June). Business Intelligence Dashboard for Academic Program Management. *2015 ASEE Annual Conference and Exposition Proceedings*, 26.312.1-26.312.19. https://doi.org/10.18260/p.23651