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Determining the Potential of Graduate Analytics Based on the iCGPA System: A Systematic Literature Review

Wan Nor Afiqah Wan Othman
Faculty of Computer Systems & Software Engineering,
Universiti Malaysia Pahang,
Pahang, Malaysia
wnor_afiqah93@yahoo.com

Aziman Abdullah
Faculty of Computer Systems & Software Engineering,
Universiti Malaysia Pahang,
Pahang, Malaysia
aziman@ump.edu.my

Abstract

This study was conducted to address the issue of gathering information to track the career and accomplishments of graduates for quality improvement in higher education. Due to the lack of a convenient method to gather information using an efficient mechanism, this study reviewed graduate analytics based on the iCGPA system with the primary aim of examining its potential utility in such a system, and vice versa. A systematic literature review was conducted to integrate the relevant academic literature related to graduate analytics and iCGPA system. Using the PRISMA method, we identified 160 different articles, but only 125 met the specified inclusion criteria. Our analysis of the accepted articles to determine the potential of graduate analytics in iCGPA system, and vice versa, produced zero results where no intersection of the two topics could be found in the research literature from 2011 to 2018. Our findings indicate an acute lack of research in these two areas. However, we believe this gap can be minimized since there are already higher education institutions in Malaysia that are currently implementing the iCGPA system. The implementation could inform us regarding how graduate analytics can be used to expand the value of iCGPA for improving the quality of Malaysian higher education graduates.

Keywords: *Graduate analytics, iCGPA system, systematic literature review, graduate tracer studies, PRISMA method*

INTRODUCTION

The term "graduate" can be defined as *alumnus* (College, 2017), or a person who has successfully completed an educational programme which earns him/her a diploma or a bachelor's degree during the referenced year (BHEF, 2016; OECD, 2001). The problem that arises in tracing graduates is recognized as an important issue and is regarded as a challenging task, especially on collecting information about the effectiveness of a given educational programme (Mijić & Janković, 2015; Mwizerwa, Robb, Namukwaya, Namuguzi, & Brownie, 2017; Rogan *et al.,* 2008; Romanick, Ng, Lee, Herbert, & Coller, 2015; Zeldovich, 2017). The existing method for addressing this issue is Graduate Tracer Study or Institutional Tracer

Studies, a method of research that has been widely adopted in several countries (Association, 2015; de Guzman & de Castro, 2008; Rogan & Reynolds, 2016; Rogan *et al.,* 2008; Sakellariou & Patrinos, 2000; Sapaat, Mustapha, Ahmad, Chamili, & Muhamad, 2011; Suryani, 2017; Tahir *et al.,* 2017; Zakariya, 2017). The aim of a tracer study is to track and retain the records of graduates to ascertain whether they are employed by their field of study. This knowledge is important for the future development of university programmes and educational goals (Mwizerwa *et al.,* 2017; Rogan *et al.,* 2008; Romanick *et al.,* 2015; Zeldovich, 2017).

Based on that, the curriculum and other related services provided by higher education institutions can be assessed based on data analysis from their tracer studies (Schomburg, 2014). However, there are some drawbacks that make this method not an efficient mechanism (Mijić & Janković, 2015; Mwizerwa *et al.,* 2017; Rogan *et al.,* 2008; Romanick *et al.,* 2015; Schomburg, 2014; Zeldovich, 2017). In relation to this, as stated in the Malaysia Education Blueprint 2015-2025 (Ministry of Higher Education, 2015), Malaysia aims to develop holistic, entrepreneurial and balanced graduates through the integrated Cumulative Grade Point Average, or what is known as iCGPA. It is a new system in reporting students' learning performances and outcomes. It is claimed to be the first in the world by Malaysia's Ministry of Higher Education (MOHE). Technically, iCGPA is a report of academic data which have been modeled or designed in an outcome-based education (OBE) curriculum. In Malaysia, it is compulsory for higher education institutions to adopt an OBE-based curriculum specified by the Malaysia Qualification Framework (MQF) in order to be accredited by the Malaysia Qualification Agency (MQA). The agency is an authority that governs the accreditation process by the law under the Malaysia Act 679. This means that iCGPA can simply be adopted by all institutions in Malaysia under the MQF.

Analytics is a statistical evaluation of data, which combines data usage, statistical analysis, and an explanatory, predictive model to recognize patterns and respond to complex issues that can help stakeholders in making better decisions with additional analytics systems and software (Dahlstrom, 2016; Educause, 2010; Rouse, 2016). Although there are various definitions of analytics, for higher education we refer to the findings reported in Bichsel (2012) that analytics is more than just a metrics. The findings also regard analytics as something new--a catalyst for transforming higher education that addresses strategic questions involving data analysis and prediction by providing insight to drive action. Therefore, analytics can be seen as a promising mechanism to overcome the limitations of the current graduate tracer studies. In other words, graduate analytics can be used to improve the existing methods in tracing graduates by gathering information in a more efficient way.

This paper presents an examination of graduate analytics and iCGPA system by screening the potential research of both topics. This study is important in synthesizing academic literature accurately and reliably since there is potential that graduate analytics can be implemented by extending the application of the iCGPA system. The following research questions were used to guide and inform this study:

1. How many relevant literature studies of graduate analytics and the iCGPA system have been published since 2000?
2. Does the existing literature indicate a relationship between graduate analytics and the iCGPA system?

3. Is there any research gap on graduate analytic?

Hence, the purpose of this study was to review articles related to graduate analytics and the iCGPA system using the systematic literature review (SLR) process to examine the potential of graduate analytics in iCGPA and vice versa.

LITERATURE REVIEW

Graduates and Alumni

Selected Irish universities in Ireland conducted a small-scale study (Gallo, 2018) to distinguish the meanings of *"graduates"* and *"alumni"* in the context of strategic plans. Their findings came to the following conclusion: *"graduates"* are students enabled by the university to participate in and contribute to the employment sector. In this context, the university is responsible for shaping their employment readiness by means of helping them acquire key skills such as reflective thinking, moral reasoning and lifelong learning. In addition, "graduates" are also defined as persons who have successfully completed an educational programmed during the reference year (OECD, 2001). From previous research, the term "graduate" has several levels of studies which are defined in Table 1. In contrast, the study defined "alumni" as successful graduates that give value to or increase the value of the institution. They are key enablers who give back to the university by advancing the university's mission and vision. In this study, the focus is on managing the "alumni" and "graduates" as stated by Gallo (2018) and OECD (2001) respectively.

Table 1:
Levels of Study Undertaken by Graduates

No	Levels of Study	References
1.	High school or secondary	Conley (2007) and Leonard (2013)
2.	Postsecondary or Tertiary i. Undergraduate – Diploma ii. Undergraduate – Bachelor's degree iii. Postgraduate	ILO (2013); World Economic Forum (2017) Bell, Finney and Blanco (2010); O'Clair (2013); BHEF (2016); Haslerig (2017); O'Clair (2013); Posselt and Grodsky (2017); Catalano (2013)

Researchers explained that the most challenging issue in studying graduates is gathering their personal information to determine whether their employment and employment status are related to what they had studied at university (Rogan *et al*., 2008; Mijić & Janković, 2015; Mwizerwa *et al*., 2017; Romanick *et al.*, 2015; Zeldovich, 2017). Nonetheless, several countries have used data from graduate tracer or institutional tracer studies for their purposes. Table 2 shows the countries that have relied on tracer study data to get the relevant feedback and collect information about graduates:

Table 2:
Countries Known to Use Tracer Study Data

Country	Studies
Malaysia	▪ Sapaat *et al.* (2011) ▪ Tahir *et al.* (2017) ▪ Zakariya (2017)
South Africa	▪ Rogan and Reynolds (2016) ▪ Rogan *et al.* (2008)
Vietnam	▪ Sakellariou and Patrinos (2000)
Other	▪ de Guzman and de Castro (2008); ▪ Pemba, Macfarlane, Mpembeni, Goodell and Kaaya (2012); ▪ Suryani (2017)

The importance of graduate tracer studies is that they provide essential information on labour market outcomes and the factors associated with these features. Besides, in the higher education context, these studies help to inform decision making related to the relevance and quality of programmes offered by the universities for future developments. As Schomburg (2014) mentioned, tracer studies are conducted with several objectives, which are: (1) to inform the development of higher education institutions (i.e., in terms of their curriculum); (2) to assess the relevance of higher education (i.e., assessment); (3) to contribute to the accreditation process; and (4) to inform all stakeholders about graduate employability. Although this method has been adopted by many institutions from various countries, it poses its own limitations that need to be addressed. The first limitation stems from access to data and low response rates from busy graduates (Mwizerwa *et al.*, 2017; Romanick *et al.*, 2015; Zeldovich, 2017), while the second limitation concerns data intensiveness (Rogan *et al.*, 2008). Last but not least, there are concerns about data quality (Mijić & Janković, 2015), time consumption, and relatively high cost of the activity (Rogan *et al.*, 2008; Schomburg, 2014).

Analytics

Analytics is the "extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions" (Davenport, Harris, & Morison, 2010). Besides, analytics is the statistical evaluation of big data sources to recognize patterns and respond to complicated issues that can help stakeholders (e.g., educational institutions, companies, and governments) in making exact decisions with additional analytics systems and software (Dahlstrom, 2016; Educause, 2010; Rouse, 2016). Hence, analytics works by subjecting the data to statistical analysis, and providing reports or visualizations; they might appear in the form of a dashboard to show patterns, trends and exceptions (Educause, 2010). As regards this study, analytics is a relevant issue that has significance to higher education (Dahlstrom, 2016). As mentioned by Educause (2010), college and university stakeholders can leverage the power of analytics to improve their institutions. Analytics are significant to use because of the existing data stored at most institutions. For higher education, data-driven decisions are the best option in both economic and pedagogical resources, while offering a structure for better educational results (Educause, 2010; Miller & Mork, 2013).

iCGPA

The Malaysia Education Blueprint 2015-2025 (MOHE, 2015) envisioned the production of university graduates with well-balanced personalities and holistic, entrepreneurial characteristics through the use of the integrated Cumulative Grade Point Average (iCGPA). The iCGPA is a new system to be used in evaluating and reporting students' development and performance which are not only depending on their field of study (academic knowledge), but also on how they perform in practical skills, social skills and responsibilities, values, attitudes and professionalism, leadership abilities, critical thinking, information management, lifelong learning skills, managerial skills and entrepreneurial skills.

The iCGPA initiative was designed to benefit stakeholders in making decisions towards quality improvement of university graduates. The stakeholders that will benefit from iCGPA include educational institutions (Yusof, Naim, Latip, Aminuddin, & Ya'acob, 2017), programme management bodies, faculty (Mohamed-Kassim & Kamaruddin, 2017), students (Yusof *et al.,* 2017), graduates (Nor *et al.,* 2017; Saad, 2017), sponsors (Paper *et al.,* 2017), employers, policymakers, and the industry. The current practice of tracking graduates is through tracer studies as discussed above. The limitations inherent in the tracer study method have given rise to the need to analyze and display data that can lead to better decision-making on the future development of higher education programmes and curricula, hence the present study.

METHODOLOGY

Systematic Literature Review

Systematic literature review (SLR) is a review of a clearly formulated question, or set of questions, that uses systematic and explicit procedures from traditional reviews and commentaries (Khan & Kunz, 2003; Moher, Liberati, Tetzlaff, & Altman, 2009; van Laar, van Deursen, van Dijk, & de Haan, 2017). The purpose of such a review is to identify, select, and critically appraise relevant research and to collect and analyze data from the studies that are included in the review. Thus, in our case, this method was chosen to identify whether there is justification for further research--or not--on graduate analytics and iCGPA system. In this study, we used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher *et al.,* 2009). The PRISMA statements consist of an evidence-based checklist of 27 items and a four-phase flow diagram. However, only a four-phase flow diagram was used to report our results.

Search Terms

The search action was conducted using the Scopus, Emerald Insight, Web of Science, ProQuest and Science Direct databases to find all pertinent articles published on graduate analytics and iCGPA. However, due to the lack of published articles on iCGPA, we included the iCGPA conference book of abstracts in this study since the proceedings were not yet available at the time this study was conducted. For each term, we used several keywords related to Graduate Analytics

and iCGPA to ensure extensive research coverage. The following parentheses with Boolean operators' search were used as each database has its own indexing terms:

(“graduate analytics” OR “talent analytics” OR “alumni analytics” OR “iCGPA”).

Selection Criteria

To select the most relevant studies that would address the research questions, we used the criteria outlined in Table 3 for all identified databases or corpuses.

Table 3:
Study Selection Criteria

Document Parameter	Criteria
Type	Peer-reviewed articles and thesis
Subject area	Technology engineering
Language	English
Publication year	2000 - 2018

For the articles themselves, we emphasized using text analysis based on keyword frequency defined in Table 4 below.

Table 4 :
List of Main Keywords and Sub-Keywords Used in the Search Process

Main Keywords	Sub-Keywords				
Talent	Talent	Skill	Performance	Edu	Academic
Stakeholder	Alumni	Graduate	Employ	Stakeholder	-
Analytics	Analytic	Tracer	Barrier	Decision making	-
Methodology	Maturity	Framework	Model	-	-
iCGPA	Icgpa	Engagement	Industry	-	-

Study Selection

Three steps were involved in the study selection. First, the titles of all captured articles were screened for eligibility that must fulfill the criteria mentioned above. Second, the abstracts from relevant articles were screened for eligibility by filtering out all ‘no abstract available' content. Third, the full-texts of all remaining publications were checked. Data extraction was part of the analysis process to see a clear picture of the results to be shown in this study. A common spreadsheet application, i.e. Microsoft Excel 2016, was used as the tool for screening the data extraction by using the text analysis method. The data extraction process was completed starting with identification up until the selection and inclusion phase.

PRISMA Flowchart

Using the search terms, 160 articles were identified from the databases. Out of the 160, 155 different articles were screened after five duplicates were removed. By screening the titles, abstracts and time periods, 135 articles came in full-text, where 125 articles met all criteria including the keyword filtering. Figure 1 shows the PRISMA flowchart (Moher *et al.,* 2009) that indicates the steps to determine the studies most relevant to the research objectives. In the eligibility stage, the full-text articles were screened and excluded based on four criteria: (1) no keyword filtering detected in the articles; (2) different subject areas; (3) no full-text available online excluding the iCGPA conference proceeding; and (4) not peer-reviewed, whether articles or theses.

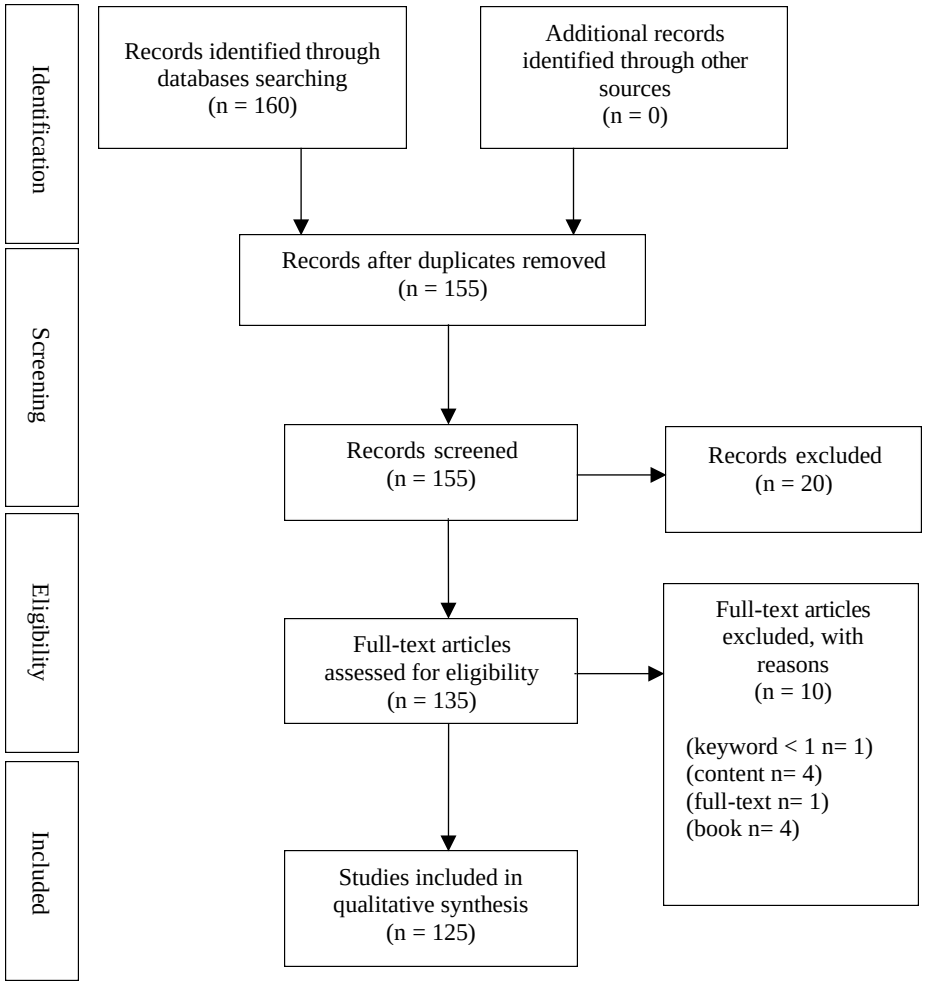


Figure 1: PRISMA Flowchart

RESULTS AND DISCUSSION

This section shares the results of data analysis on the graduate analytics based on the iCGPA system. As illustrated in the PRISMA flowchart (Figure 1), the results of all screening in each phase indicated that only 125 articles could be included in this study. The number of articles

written on graduate analytics and iCGPA system since year 2000 is presented in Table 5. The list of all articles that are related to this topic can be referred to in the appendix.

Table 5:
Number of Studies on Graduate Analytics and iCGPA System Since 2000

Year	Strict Search		Group Search		Combined Search
	iCGPA	GA	iCGPA	GA	iCGPA and GA
2011	0	0	4	6	6
2012	0	0	1	3	3
2013	0	0	1	2	2
2014	0	0	4	15	15
2015	0	1	4	9	9
2016	0	0	1	3	3
2017	57	0	60	82	83
2018	0	0	1	4	4
Total	57	1	76	124	125

In Table 5, *"Strict Search"* refers to the actual search conducted using the two main keywords, namely "icgpa" and "graduate analytics," while *"Group Search"* involved the use of main keywords and sub-keywords as shown in Table 4. Lastly *"Combined Search"* refers to the combined use of both main keywords and sub-keywords. As indicated in Table 5, no articles between 2000 and 2010 were selected as their full texts could not be located, hence they were excluded in the selection process (see Figure 1). Therefore, for 10 years at least, there was a gap in this research area, although some research activities showed up from 2011 until 2018.

Table 5 indicates the highest number of articles using the search keywords popped up in the year 2017. It was mostly extracted by the "iCGPA" keyword (i.e., 57 articles were extracted on strict search and 60 articles on group search). This could be due to several reasons, the first of which is that the iCGPA system, at the time the study was conducted, was a newly introduced system that was being heavily promoted. Another factor was the fact that the iCGPA International Conference was held on 17-19th July 2017, an event that contributed to the increasing number of articles in 2017. Table 5, however, shows a sharp decline in 2018 due to external factors such as changes in national legal policy and financial resources. This topic is still expected to garner some interest, as shown in Table 5, as four (4) articles showed up after a "combined search" was conducted for 2018.

As illustrated in Figure 1, the process is continued to examine the relationship between Graduate Analytics and iCGPA system. The results are shown in Table 6.

Table 6 :
Potential of Graduates Analytics Based on the iCGPA System

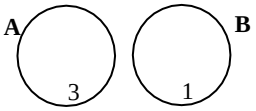
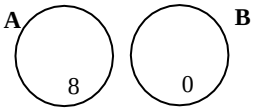
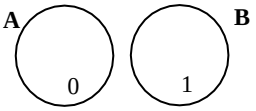
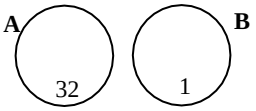
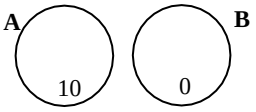
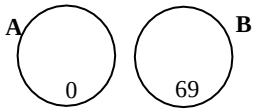
Sources	Terms			Visual Relation
	A = graduate/talent analytic	B = icgpa	A*B	
Scopus	3	1	0	
Emerald Insight	8	0	0	
WoS	0	1	0	
ProQuest	32	1	0	
Science Direct	10	0	0	
iCGPA Conference Proceeding	0	69	0	

Table 6 depicts a visual illustration of the possible intersections between the graduate analytics and the iCGPA system research and publication literature. The text analysis in Microsoft Excel was conducted by extracting all remaining articles included in this study. The five (5) databases and one (1) conference proceeding were used to make it simpler and provide a clearer picture to show whether information about iCGPA could be acquired in Graduate Analytics articles, and vice versa. As shown in Table 6, 'A' and 'B' represent the number of articles that used "graduate/talent analytic" and "icgpa" search terms respectively in each source, while 'A*B' is the result of keywords frequency conducted using the following parentheses with Boolean operators' concept:

("graduate" AND "analytic" AND "graduate analytic" AND "icgpa").

On 'A*B' see (Table 6), the result is zero (0) for all remaining articles included in this study. The visual relation indicates that in each source, there are no intersections of the two sets of A and B.

Table 7:
Number of Articles Extracted Using "graduate analytic" as Main Keyword

Year	Main Keyword
	"graduate analytic"
2011	0
2012	0
2013	0
2014	0
2015	1
2016	0
2017	0
2018	0

Table 7 shows the number of articles extracted using "graduate analytic" as the main keyword, which addresses the third research question. Despite our efforts of going through multiple databases, our extensive search results produced only one article published in 2015 on the subject. The discovery supports our hunch that there is a lack of research on Graduate Analytics. Additionally, we also found this article to have no citation at all, suggesting a lack of interest in this area.

CONCLUSION

The results of our systematic review of the literature on Graduate Analytics and iCGPA system existing in peer-reviewed databases show a lack of research and publication in these topics (as shown in Figure 1, Table 5 and Table 7). Further, the findings presented in Table 6 show no literature at all on Graduate Analytics and iCGPA system, as no intersection was indicated between them. Our review has shown that there is a research gap on Graduate Analytics and iCGPA system. There is a likelihood that this gap can be minimized since there are already higher education institutions in Malaysia that are implementing the iCGPA system. The implementation can produce insight on how higher education institutions can expand the value of iCGPA with graduate analytics. The use of graduate analytics will help to address the limitations of the existing tracer studies by improving data quality, reducing costs and time consumption, boosting alumni fundraising, and promoting continuous program improvement. Moreover, with the use of analytics to track graduates by analyzing and displaying data in an interactive visualization or dashboard, stakeholders will be allowed to filter through the data, and get an overarching view of all information gathered to make better decisions concerning the employability of graduates and the quality of their respective higher education programmes and training (Dahlstrom, 2016; Educause, 2010; Rouse, 2016).

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APPENDIX

Bil.	Title	Year	Total Keyword
1.	Workforce planning in professional service firms	2011	35
2.	An Exploration of the Strategic Decision Making Process and the Influence of Appreciative Inquiry and SOAR on a Senior Leader's Use of Analytics	2016	25
3.	The Implementation of iCGPA at Universiti Malaysia Terengganu: Challenges and Implications for the Social Science Disciplines	2017	20
4.	Global Talent Management: A Qualitative Case Study of the Engineering Talent Shortage	2014	20
5.	Developing analytical leadership	2011	20
6.	Towards Integrated Cumulative Grade Point Average (iCGPA) in Community College Malaysia	2017	18
7.	Implementation of iCGPA the Development of Peer Evaluation System in Team work Skills Assessment	2017	17
8.	The Success and Achievement of Engineering Students' iCGPA from an Industry Practitioner's Perspective	2017	16
9.	Problem-Based Learning (PBL) Approach for Learning Outcome Assessment on Critical Thinking/ Problem Solving and Teamwork Skills in Sensory Evaluation Course	2017	16
10.	Integrated Cumulative Grade Point Average (iCGPA): Feedback from the Hospitality Industry Players	2017	16
11.	Stakeholder Digital Response Model of iCGPA Awareness Survey	2017	16
12.	Exploring HR Intelligence Practices in Fortune 1000 and Select Global Firms	2015	16
13.	A multi-level framework for understanding global talent management systems for high talent expatriates within and across subsidiaries of MNEs: Propositions for further research	2018	16
14.	State of the art analytics and managers in the defense industry	2014	16
15.	Enhancing Psychomotor Skills in Aquaculture Breeding Program Education Using Simulation Model	2017	15
16.	iCGPA: A Tool in Developing Holistic, Entrepreneurial and Balanced Higher Education Graduates for the 21st Century	2017	15
17.	The Effect of Lecturer Professionalism and Teaching Activities on Course Learning Outcomes: A Conceptual Review	2017	15
18.	Intervention Programmes towards Improvement of Student's Performance in Implementation of iCGPA	2017	15
19.	How to Make More than 9000 Faculty Members Internalize iCGPA?	2017	15
20.	A unified foundation for business analytics	2014	14
21.	Major employers' hiring practices and the evolving function of the professional master's degree	2014	14
22.	Developing talent intelligence to boost business performance	2011	13
23.	From data to decision: An implementation model for the use of evidence-based medicine, data analytics, and education in transfusion medicine practice	2015	13
24.	Perceptions of Human Resource Professionals on Using Data Analytics for Talent Management	2018	13

25.	Education, Multi Skill Sets, and Effective Management of the Revenue Cycle Team	2014	13
26.	Driving business growth in the information economy: New perspectives from technology vendors and entrepreneurial ventures	2015	13
27.	Challenges of iCGPA in Assessing Graduate Students Attributes Aminah	2017	12
28.	Development of Student's Intervention Modules through iCGPA System	2017	12
29.	iCGPA in Enhancing Explicit Assessment Based on Requirement of the Engineering Accreditation Council to Produce Holistic and Balanced Graduates	2017	12
30.	Make your people before making your products: How to maximize the potential of an inclusive workforce	2015	12
31.	Leadership attributes of enrollment managers in higher education institutions in the United States	2011	12
32.	Self-employment differentials among foreign-born STEM and non-STEM workers	2017	11
33.	Is Tutor Assessment Alone Adequate in Teamwork Skills?	2017	11
34.	Problem-Based Learning (PBL) Approach for Learning Outcome Assessment on Critical Thinking/ Problem Solving and Teamwork Skills in Sensory Evaluation Course	2017	11
35.	Implementation of Integrated Cumulative Grade Point Average (iCGPA) Towards Academic Excellence in Malaysia	2017	11
36.	Digital iCGPA Simulator: A Tool for Inclusive Stakeholders Engagement	2017	11
37.	iCGPA using the Framework Leader of Character	2017	11
38.	Comparison Between iCGPA Assessment Using Course Learning Outcomes and Total Marks: A Case Study at Universiti Malaysia Sabah	2017	11
39.	Exploring Students Self- Evaluation of Their Learning Outcomes Attainment through an Integrated Cumulative Grade Point Average (iCGPA) Reporting Mechanism	2017	11
40.	ICGPA as an integrated grading system: A qualitative study	2017	11
41.	Managers' responses to formal and informal talent management practices: An exploratory mixed methods study	2017	11
42.	Bottom-Up Approach to iCGPA Implementation at Universiti Malaysia Terengganu: A Small Task Force with a Big Impact	2017	11
43.	A dialectic on graduate analytics education	2015	10
44.	An Analysis of Course Assessment Plan Towards Academic Performance	2017	10
45.	Educational Program Quality Management Framework	2017	10
46.	UPSI iCGPA Bitara Model: Towards Excellence of Teacher Professionalism	2017	10
47.	Cognitive Assessment: More or Less is Better?	2017	10
48.	Implementation of iCGPA for Co-Curricular Courses	2017	10
49.	Internalisation of Constructive Alignment in Outcome-Based Education among Academic Administrators	2017	10
50.	Voice of One of the Pilot Universities in Dealing with Issues and Challenges in the Implementation of iCGPA	2017	10
51.	Implementing iCGPA at the Course Level: The Case of LMCR 3132 Environmental Philosophy Course	2017	10

52.	Production of star performers in organizations: An examination of two competing models and mechanisms	2016	10
53.	Contributions of Professional Certification and Information Technology Work Experience to Self-Reported Job Performance	2012	10
54.	Lexical indicators in employees' qualitative survey responses: Linking psychological ownership to key work outcomes	2015	10
55.	Student Appraisal using iCGPA as Performance Indicator: A Case Study of First Year Mechanical Engineering Programme at UiTM Penang	2017	10
56.	Comparative Study on the Learning Outcomes Attainment Report of Programs with Different Number of Learning Outcomes	2017	9
57.	Evaluating UMS Teachers and Learners Experience in Adopting iCGPA Towards Quality Improvement	2017	9
58.	Visual Analytics Template of Curriculum Design Based on Malaysia Qualification Framework (MQF)	2017	9
59.	Implementing iCGPA: Automating Computation with iOBE	2017	9
60.	The Journey towards an Ideal Match of iCGPA and 21st Century Ready English Teachers: The Case of Public University in the Northern Region of Malaysia	2017	9
61.	Talent management decision making	2012	9
62.	Proactive IT Incident Prevention: Using Data Analytics to Reduce Service Interruptions	2017	9
63.	Factors Affecting Employee Trust in Leadership	2014	9
64.	Contribution of talent analytics in change management within project management organizations the case of the French aerospace sector	2017	9
65.	Knowledge, Motivation and Organizational Influences Impacting Recruiting Practices Addressing the Gender Gap in the Technology Industry: An Evaluation Study	2017	9
66.	Perceived Employability and Competence Development	2012	8
67.	Holistic Reporting of Graduate's Outcomes: Consideration between All and Selected Courses	2017	8
68.	Embedding iCGPA using the Outcome-Based Education Approach: A Pilot Study of Universiti Tunku Abdul Rahman (UTAR)	2017	8
69.	Comparison of Cumulative Grade Value between Conventional Method and iCGPA System	2017	8
70.	The introduction and application of recursive partitioning methods in organizational science	2013	8
71.	Four questions every leader needs to ask about talent management	2014	8
72.	A theoretical and empirical study of global talent management: Three operationalizations of GTM and their impact on firm performance	2017	8
73.	An Exploratory Study of the Role of the Human Resource Information System Professional	2017	8
74.	A qualitative case study of the talent management process across project-oriented companies within the intellect industry	2015	8
75.	Pervasive Business Intelligence: a Marketing Intelligence Framework Proposal	2015	8
76.	HR tech startups in India	2018	8
77.	Engaging Students Learning through Implementation of iCGPA Underpinning by Constructive Allignment	2017	8

78.	Making economics real—The Economics Internship	2013	7
79.	An Academic–Practice Partnership to Advance DNP Education and Practice	2017	7
80.	Improving Graduates Soft Skills by Designing Curriculum using Constructive Alignment	2017	7
81.	Problem-Oriented Project-Based Learning an Initiative to Mould Balance Graduates	2017	7
82.	Measurement of Student Learning Outcomes	2017	7
83.	The Measurement of Student Learning Outcomes in a Holistic Learning Environment	2017	7
84.	A New Integrated Assessment and Reporting Mechanism for Extra Curricular Activities	2017	7
85.	iCPGA Methodological Approach in the Course 'Introduction to Chemical Engineering': A Case Study	2017	7
86.	Common Characteristics and Attributes of Self-Managed Virtual Teams	2011	7
87.	The impact of action learning on perceived objective career success	2014	7
88.	Integrating Islamisation and Virtue in iCGPA at IIUM	2017	7
89.	Empowerment of Outcome Based Education Through Integrated Cumulative Grade Point Average	2017	7
90.	Feedback on Competencies and Performance of UKM Medical Graduates	2017	6
91.	Development of Integrated Learning Management System Aligned with UPSI iCGPA Model	2017	6
92.	Individual employee retention in small businesses located in a metropolitan southern marketplace: An exploratory qualitative inquiry	2014	6
93.	Using Action Research to Support an On-going Organizational Culture Transformation in a Health Care Organization	2016	6
94.	Online iCGPA Reporting System as a Holistic Reflection of Outcome-Based Education in Universiti Malaysia Terengganu	2017	6
95.	Pilot Implementation of iCGPA in UPM	2017	6
96.	Assessing Students' Learning Outcome in Gross Anatomy Lab in Aligned Assessments in Cohorts 2015-2017	2017	5
97.	University Social Responsibility Project Enhances Undergraduates' Teamwork Skill	2017	5
98.	A strategic approach to workforce analytics: Integrating science and agility	2018	5
99.	Knowledge retention and transfer in an IT community of practice: Leader and former participant perspectives	2014	5
100.	Validity in Learning Outcomes Measurements Ensures Valid iCGPA Interventions	2017	5
101.	ICGPA at UKM: Experience of Faculty of Islamic Studies	2017	5
102.	The online social networking of cyberspace: A study on the development of an online social network project and the sport industry's perception of its relative advantage	2011	5
103.	Preliminary Implementation of iCGPA at TISSA-UUM	2017	5

104.	Gamification as a Formative Assessment in Measuring Learning Outcomes in Practical Session among Medical Students in Universiti Kebangsaan Malaysia	2017	4
105.	Health Science Students' Perspectives on Group Work	2017	4
106.	Integrating global mobility and global talent management: Exploring the challenges and strategic opportunities	2014	4
107.	The Effects of Human Capital and Voluntary Human Capital Disclosures on Investors' Decision-Making and Assessments of Firm Value	2014	4
108.	Human capital analytics: too much data and analysis, not enough models and business insights	2017	4
109.	The Adoption of Authentic Assessment into Constructive Alignment and iCGPA Implementation	2017	4
110.	The Effectiveness of Outcome Based Assessment for Introduction of Civil Engineering (ECM157) Implementation	2017	4
111.	Constructive Alignment in Outcome-Based Education (OBE)	2017	3
112.	Students' Acceptance towards Lecturers' Feedback during Performance Assessment	2017	3
113.	A complexity theory approach to IT-enabled services (IESs) and service innovation: Business analytics as an illustration of IES	2014	3
114.	Why is Empowerment Important in Big Data Analytics?	2017	3
115.	Constructive Alignment Review for iCGPA Implementation: UPSI Experience	2017	3
116.	Simplified Sheets for Part Timers Facilitator to Increase Efficiency in Marks Management in Supporting iCGPA	2017	3
117.	The relationship between motivation and hygiene factors in Generation Y	2015	2
118.	The Impact of iCGPA on Outcome-Based Education Competency among Lecturers: A University-Wide Action Research Project	2017	2
119.	Complying MQA Programme Standards and University Requirements in iCGPA for UKM's Media Communication Programme	2017	1
120.	Empowering Fundamental Skills in Biotechnology to Aquaculture Students: An Integrated Approach	2017	1
121.	Entrepreneurial Courses Delivery & Assessment Methods towards Achieving the Course Learning Outcomes	2017	1
122.	Design thinking in talent acquisition: a practitioner's perspective	2014	1
123.	The role of organizational leaders in the motivation of high performers	2014	1
124.	The datafication of talent: how technology is advancing the science of human potential at work	2017	1
125.	Aligning Technology-Aided Teaching with Student Learning Outcomes: Case Study for Genetics and Biochemistry Courses	2017	1