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Digital iCGPA Simulator : A Tool for Inclusive Stakeholder Engagement

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Abstract

Engaging stakeholders particularly student in iCGPA adoption through conventional physical seminar or face to face meeting may not an effective approach to reach total inclusive engagement within short time. Furthermore, it is costly to perform impact assessment on such approach timely and almost impossible to be implemented for real time monitoring and decision making. This paper discusses an alternative approach to engage students on iCGPA adoption by using digital simulation approach. We used a common spreadsheet application (Microsoft Excel 2016) as a tool to develop the simulation. The rationale is, all Universiti Malaysia Pahang (UMP) students have access to download a free original Office 365 suite through Malaysia Ministry of Higher Education subscription. The result is, we manage to automate the calculation of iCGPA values based on the calculation model adopted by UMP and visualize the performance on each program learning outcomes with spider web or radar chart. The tools also capable to visualize interactively the area of improvement based on the minimum score weight set by the use. At this stage, we have not yet test the tool in campus wide implementation but rather than tested in small scale class level. We received positive feedbacks from student where the tool seems can be used as an effective application to simulate and engage students in iCGPA adoption at UMP. We are in planning to further develop the tool to be implemented in online environment with analytics mechanism.

Keywords: Stakeholder Engagement; Digital Simulator; Visualization;

1. Introduction

Integrated Cummulative Grade Point Average or iCGPA is a new system for reporting student learning performance and outcomes. It is claimed to be the first in the world by Ministry of Higher Education (MOHE) in Malaysia. Technically, iCGPA is a reporting of academic data which been modeled in an Outcomes Based Education (OBE) design of curriculum. It is expected to offer much better insight for various stakeholders as been mentioned by MOHE particularly to address the issue on graduate employability (GE). With the dynamic and rapid transformation of economy model globally due to the Fourth Industrial Revolution (Schwab, 2016; World Economic Forum, 2016), it seems iCGPA implementation is the right remedy to embrace such transformation. The fundamental of such transformation can be simply viewed as a tasks replacement that prior operated by human with more efficient digital technology. Even there are critics on the negative impact of such transformation such as distruptive of business model, but there are great opportunities which have not yet been explored such as emerging of new kind of jobs and industries. In our context, we attempt to use digital technology for stakeholder engagement in iCGPA implementation.

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2. Literature Review

Stakeholder engagement is very critical in change management especially when introducing innovation which challenging the status quo of existing culture or practice in institution. The main factors on how innovation can be successfully take place in institutions commonly influenced by the triple constraint of time, cost and scope/quality, in addition to the impact of innovation or expected user value proposition (Baugh, 2015). Previous study (Moraru, 2012) reviews that there is close relationship between internal stakeholders, management and institution performance. The finding indicates there is a strong correlation between a number of internal stakeholder attributes and long-term performance objectives such as innovation and customer retention (Ahmad, O'Regan, & Ghobadian, 2005).

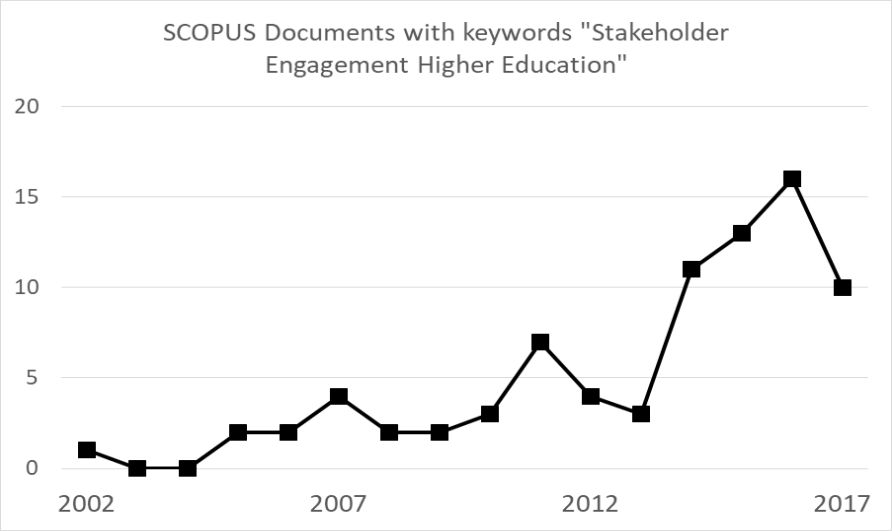

Figure 1 Search Result from SCOPUS database with keywords "Stakeholder Engagement Higher Education" retrieved on 21 June 2017.

Based on our search in SCOPUS database, study in application of stakeholder engagement model in higher education still in infancy stage with only 80 documents retrieved globally although there is an incremental pattern over the time (Figure 1). Based on this initial findings, our motivation is to conduct pre-evaluation of digital simulator for stakeholder's engagement in iCGPA implementation.

3. Methodology

This pre-liminary study is only been conducted in qualitative approach by performing comparison analysis of innovation success factors between conventional and our proposed approach. Our analysis identified innovation success factors elements to engage primary stakeholder (student) in iCGPA implementation through digital simulation tool. We used a common spreadsheet application (Microsoft Excel 2016) as a tool to develop the simulation of iCGPA mechanism.

4. Results and Discussion

Figure 2 shows the visual model for student to enter their performance or score in each course or subject they took according to program learning outcomes (PLO). The core of iCGPA implementation is depend on this first and foremost step.

Student Name
Student ID

	Course				PLO1			PLO2			PLO3			PLO4			PLO5			PLO6			PLO7			PLO8			Overall
	Code	Name	Group	Credit Hours	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight	Full Mark	Score	Weight
1	UHR1012	Islamic and Asian Civilizations		2	60%	100	98	20%	50	20	10%	100	46	5%	60	43	5%	100	48											100%
2	UHS1021	Soft Skills 1		1	80%	100	49	10%	100	90	10%	100	50																100%
3	UQB1011	Briged Siswa (KOKURIKULUM)		1	60%	100	50										10%	90	55				30%	50	30				100%
4	BUM1233	Discrete Mathematics		3	80%	100	90																20%	50	45				100%
5	BCN1043	Computer Architecture		3	60%	70	50							20%	100	40	10%	100	39	5%	100	77				5%	100	87	100%
6	BCS1033	Software Engineering		3	60%	100	98				30%	100	60							10%	100	90							100%
7	BCI1143	Problem Solving		3	60%	100	56										40%	100	89										100%
				16	4.6	1510	1177	0.3	200	130	0.5	600	322	0.25	420	206	0.65	890	535	0.15	600	501	0.5	200	165	0.05	300	261	

Figure 2: Screenshot of Mark Entry (input)

Figure 3 shows the calculation of grade points for each PLO by compute the relative index with range from 0 to 4 based on student achievement (acquired mark against total mark) of each course. The cell or box with blue colour indicate the iScore is a value for student to find interactively which courses and PLO that achieved below the entered value. In this case, the value of iScore is 50% which mean student is targeting to achieve at least 50% for each PLO in each course. The red coloured values will indicate automatically for student to easily noticed and look for plan readjustment or strategy realignment. Based on the index computed for each PLO, the spider web or radar chart is plotted automatically for student to see overall performance for each PLO. With different values or score entered by student, the visualization will change automatically which we expected promote student awareness or conciousness of their plan through informed decision making(Evans, 2013; Marsh, Pane, & Hamilton, 2006; Moogan, Baron, & Harris, 1999) and self-regulation skills(Koch & Nafziger, 2011; Lunenburg, 2011).

Find my iScore below			50%	iScore							
	Code	Name		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
1	UHR1012	Islamic and Asian Civilizations		196 / 200	40 / 100	92 / 200	86 / 120	96 / 200			
2	UHS1021	Soft Skills 1		49 / 100	90 / 100	50 / 100					
3	UQB1011	Briged Siswa (KOKURIKULUM)		50 / 100				55 / 90		30 / 50	
4	BUM1233	Discrete Mathematics		270 / 300						135 / 150	
5	BCN1043	Computer Architecture		150 / 210			120 / 300	117 / 300	231 / 300		261 / 300
6	BCS1033	Software Engineering		294 / 300		180 / 300			270 / 300		
7	BCI1143	Problem Solving		168 / 300				267 / 300			
				1177 / 1510	130 / 200	322 / 600	206 / 420	535 / 890	501 / 600	165 / 200	261 / 300
				77.95%	65.00%	53.67%	49.05%	60.11%	83.50%	82.50%	87.00%
			iGPA	3.90	3.25	2.68	2.45	3.01	4.00	4.00	4.00

Figure 3. iGPA calculation

Table 1 describes all of the innovation success factors and summary of discussion on each factor for both conventional and our proposed teachnique.

Table 1. Qualitative Analysis of Innovation Success Factors

Impact	**Seminar**	**Digital Simulator**
Time	*Static*	*Dynamic*
	- *Student can access information on specific time scheduled by respective officer for the seminar.* - *Must be scheduled/serial approach for large number of student/participant which causing additional cost..* - *Impact can be assessed only*	- *Student can access the simulator anytime using their computer.* - *Simulator can be shared easily on social networking sites or internal Learning Management System (LMS).* - *Can be executed in parallel approach through Internet.*

	through additional assessment exercise (survey etc).	- *Impact can be assessed automatically with web analytics or server log analysis without additional exercise involving student.*
Cost	*High cost* - *Special payment to the speaker* - *Space/room availability* - *Electricity*	*Low cost* - *Using existing infrastructure of Internet connectivity* - *Using common productivity software (MS Excel).*
Scope/Quality	*Limited interactivity and no experience based learning* - *Student only can listen to the explanation which might not engaging so much considering current generation of student (Gen Y).* - *Impact on number of student is subjected to participated student at specific scheduled time and only perform in linear model.*	*Rich interactivity and experience based learning* - *Student can 'play' with the simulator to experience cause and effect of iCGPA calculation model that fit well with Gen Y.* - *Impact on number of student can be propagated using Internet (social networking sites) and potentially perform in exponential model.*

5. Conclusion

The proposed digital simulator to engage primary stakeholders through digital simulation provide better performance for all identified innovation success factors. It should be noted that this study is still in pre-liminary level which indicates further study is needed for designing and validating the concept of digital simulator. Strategic co-creation or stakeholder crowdsourcing approach will be considered in future study to ensure the success of iCGPA implementation. We are in planning to further develop the tool to be implemented in online environment with analytics mechanism.

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