



Curriculum Reform: Assessing the Curriculum Understanding in Developing Effective Teaching and Learning Strategies Among Logistics and Supply Chain Teachers at Polytechnic Malaysia

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Abstract

Developing teaching and learning strategies is not simple; many factors must be considered, that begins with knowledge and comprehension of the learning curriculum, the use of technology, knowledge of the lesson contents, taxonomy level, and culminating in the classroom environment. The teacher's knowledge and understanding of the curriculum are crucial for them to draft the formula for teaching and learning strategy because the desired outcome is to produce a graduate with holistic characteristics who excel both academically and socially aspect. This quantitative research was conducted by distributing a set of questionnaires to 50 lecturers in the field of logistics and supply chain. Throughout this research, researchers have cited the lecturer's knowledge and comprehension of the Logistics and Supply Chain curriculum as the primary focus of the lecturer's efforts to develop effective teaching and learning strategies. The software Statistical Package for the Social Sciences (SPSS) Version 27 tests mean values, standard deviations, frequencies, percentages, and correlations in this quantitative study. According to the descriptive analysis, the mean value of the lecturer's curriculum knowledge was 4.4554, and the mean value of the lecturer's curriculum comprehension was 4.8888. With a correlation value of 0.81, Pearson's correlation analysis revealed a significant relationship between the variables tested on a very strong scale. Therefore, it is crucial for teachers to really understand the goals and objectives of the curriculum so that they can strategize their teaching and learning activities effectively.

Keywords: - Curriculum, teaching and learning, curriculum understanding, curriculum knowledge

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1. Introduction

A curriculum is a sequence of experiences based on standards in which students practice and achieve proficiency in content and applied learning skills. The curriculum is the primary guide for educators about what is necessary for teaching and learning so that all students can access a rigorous academic experience. The curriculum's structure, organization, and considerations are designed to enhance student learning and facilitate

teaching.

Referring to Education Act 1966, a curriculum must contain the objectives, methods, materials, and assessment necessary to support teaching and learning. In addition, an education program needs to include the curriculum and co-curricular activities that have all knowledge, skills, norms, values, cultural elements, and beliefs to help the development of a student fully in terms of physical, spiritual, mental, and emotional as well as to instil and enhance the desired moral values and to convey

knowledge (Ministry of Education Malaysia, 2023).

As educators, it is vital for them to deeply understand the curriculum documents for them to determine and deliver the contents of the syllabus to the students. A curriculum document contains teaching and learning instructions, goals, content, strategies, measurement, and resources. The curriculum can be interpreted in three different ways: conceptually, practically, and in terms of a specific field of study (Green, 2022). Furthermore, the importance of the curriculum can be understood as it is part of the education system; deficiencies in the education process will occur without the curriculum (Hasmori, Sarju, Norihan, Hamzah, & Saud, 2011).

1.1 Problem Statement

The issues on curriculum and its implementation are not discussed much in the context of teachers' knowledge and understanding. The implementation curriculum should begin with a clear understanding of the philosophy, the goals to be achieved, the design, the content, and the scale of the curriculum itself. Educators should know the subject matter and possess teaching skills, including connecting knowledge, skills, and values (Hassan, Zailaini, & Darussalam, 2020).

The implementation of the curriculum involves more than just simply following what has been outlined and stated in the curriculum's documents. In addition, it must be translated and understood concisely from different angles of perspectives. Before establishing teaching and learning strategies and constructing assessment items for students, curriculum perspectives must be well-translated because the curriculum includes the instructional of the syllabus and taxonomy levels that must be achieved. The curriculum offers ideas and strategies to assess student progress, and it needs to be met for students to advance to the next level; without guidance from the curriculum, the teacher will not be able to ensure students get enough supplies to move to the next level (Patanka & Jadhav, 2013).

The knowledge of the instructors or teachers on the respective curriculum and the construction of teaching and learning strategies will determine the success or failure of student development. Attitudes will determine the amount of effort, perseverance, and the teacher's decision on whether the curriculum is planned and implemented (Salleh, 2003). The context of this study is to identify the level of knowledge, understanding, and correlations between the two variables in the lecturer's efforts to develop effective strategies for developing the teaching and learning agenda.

1.2 Research Objectives

This study was conducted with three main objectives as follows:

1. Identify the level of teachers' knowledge of curriculum reformation content in developing effective teaching

and learning strategies.

2. To identify the level of understanding among teachers in designing effective assessment items based on the curriculum reformation.
3. Identify the relationship between the level of knowledge and understanding of teachers in designing an effective teaching and learning strategy.

1.3 Research Hypothesis

There is no significant relationship between the lecturer's knowledge and their understanding of the curriculum reformation.

2. Literature Review

2.1 Curriculum Reform

Curriculum reform refers to the changes required to attain learning objectives considering the changes that have occurred in the present. Curriculum reform is essential to make the curriculum more integrated in terms of design, structure, and content, as well as implementing the most recent T&L approaches and meeting the Industry 4.0 requirements. The accelerating growth of automation industries indicates that the world's special education programs are in need and their graduates must be adapted for them to remain competent and prepared for the Industrial Revolution. 4.0 with extensive planning (Noorashid, 2019). Based on this fact, a country usually tries to form its educational curriculum based on a deep understanding of its community.

In other words, each nation seeks to create a model uniquely tailored to meet the requirements of its community (Haris, 1992). The curriculum has a significant cultural and political role in a society because it establishes the information and skills that are most important for its citizens and that should be passed on to future generations (Gouëdard, Pont, & Huang, 2020).

2.2 Curriculum

There are various definitions related to the curriculum; the term curriculum comes from the Latin word 'curere,' which means a 'racetrack,' 'path,' or 'trail. According to Glatthorn, Boschee, & Whitehead, (2019), a curriculum can be described either prescriptively or descriptively. Prescriptive specifies the do's and don'ts in the form of a plan and also includes the desired program and expert counterparts. The descriptive definition means that it omits the prescriptive description, which is curriculum-specific and covers the experience.

The Ministry of Higher Education Malaysia (2012) defines curriculum as a term that refers to what is conveyed, such as the integrated curriculum of the primary school and the integrated curriculum of the secondary school, which specify what students should learn. Secondly, the curriculum probably refers to the principles built and becomes a basis for the teaching and

learning approach strategy as contained in the competency-based curriculum (Competency-Based Curriculum).

Third, the curriculum will probably mention what, how, and why instructions should be given. Quoted from the same book, Dewey (1902) interprets the curriculum as a method and a way to promote the cultural experience of a race. He interprets the curriculum as a continuous formation process, the occurrence of a shift from the student's current experience to a new experience offered by the body of knowledge referred to as the field of study.

2.3 Knowledge

Knowledge typically consists of both theoretical notions and ideas and practical understanding based on actual experience completing certain tasks (OECD, 2019). Different fields of study would be a challenge; therefore, it is crucial for the teachers to deeply understand the respective knowledge. It is aligned with Suhairi & Ahmad (2017) where the influence of the teacher's understanding of the subject's content on classroom practice is essential matters. As teachers, it is a must for the teacher to ensure that the students can acquire the knowledge (Indrani, Chrisia, & Janaki, 2018).

The role of the teachers or instructors is to widely spread the curriculum that has been created and will be executed based on the knowledge and skills held can be considered as requiring an understanding of the curriculum. Salleh (2003) clearly states that the main factor that determines the spread of the curriculum is the teacher based on the ideology and knowledge of the spreader himself.

The curriculum objectively states the learning content, achievement grades, percentages, topics, and titles that should be taught in an ordered manner. It also includes the lists of the content, materials, resources, and processes to assess the objectives (Campbell-Phillips, 2020). The ability of the teachers to improve teaching and learning through the curriculum relies on their knowledge and communication skills. Such factors include classroom management, communication skills, and media use (Mat Som & Syed Ali 2011). The teacher's knowledge and skills can also determine the extent to which the content of a subject can be mastered and delivered effectively.

2.4 Understanding

The Merriam-Webster dictionary defines comprehension as a person's ability to understand the meaning or the ability to make an experience comprehensible by using concepts and categories. Understanding the curriculum reflects the formation of knowledge and students' thinking abilities. It is essential to recognize the reference to experience, not only the experience of students with the curriculum but the experience that all stakeholders, including teachers, have with the curriculum's design, implementation, and evaluation (Mitchell, 2016).

From the perspective of understanding the curriculum, the teacher is the primary key player in the implementation and success of the curriculum; the teacher also plays the role of a planner, implements the actual curriculum, and will face challenges in the learning process (Razali, Mohd Yusoff, & Osman, 2017). The relationship between education, curriculum, and society is interdependent because, through the education system and robust curriculum planning, as well as the interaction between teachers, students and parents, and community, it will create a society that can live with the spirit of simplicity and understanding the reason for its existence (Hasmori¹, Sarju, Norihan, Hamzah, & Saud, 2011).

3. Methodology

This research sample comprises teachers from polytechnics that offer a Diploma in Logistics and Supply Chain Management programme. A pilot test questionnaire is developed by referring to the literature review. The sample for the pilot test comes from teachers who are teaching in the same field. Throughout the trial, the researcher can identify issues with the questionnaire. If the questionnaire is not precise, it should be examined and rewritten. Table 1 shows the result of the reliability test. The Cronbach's Alpha value is 0.880, indicating that the questionnaire is good and acceptable.

Table 1. Cronbach's Alpha value

Cronbach's Alpha Value
0.880

The questionnaires are distributed by using Google Forms. The questionnaire is divided into three sections. In section A, the questionnaire addresses demographic information such as gender, institution, experience in teaching logistics, and first-degree studies, whereas section B focuses on curricular knowledge. In comparison, Part C is about understanding the curriculum. These sections are based on a self-evaluation ratio on a 5-point Likert scale. Moreover, the questionnaire uses the Likert scale because the reliability level is superior.

Table 2. The number of questionnaire items.

No	Section	Number of Items
1.	A: Demographic	4
2.	B: Knowledge	11
3.	C: Understanding	17
<i>Total Item</i>		42

Descriptive statistics, which involved mean and standard deviation for all items, were used, and the interpretation is based on the mean scores recommended by Moidunny (2009) as shown in Table 3.

Table 3. Level determination

No	Level	Interval Mean Score
1.	Very High	4.21 until 5.00
2.	High	3.21 until 4.20
3.	Medium	2.61 until 3.20
4.	Low	1.81 until 2.60
5.	Very Low	1.00 until 1.80

In this study, the researcher estimated the strength of the correlation between variables based on guidelines by Cohen & Swerdlik (2002) as shown in Table 4.

Table 4. Correlation strength

Negative	Positive	Correlation Strength
-0.50 until -1.00	0.50 until 1.00	Strong
-0.30 until -0.49	0.30 until 0.49	Moderate
-0.01 until -0.29	0.01 until 0.29	Low
0.00	0.00	No Correlation

IR 4.0 is an emerging technology which involves Artificial Intelligence (AI), Big Data Analytics, Internet of Things (IoT), Cloud Computing, Augmented Reality, Simulation, Cyber Security, Systems Integration, Additive Manufacturing, and Robotics & Autonomous Systems by organizations (Othman, 2021). The recent development of IR4.0 technology has further increased the role of PLC use in the automation and manufacturing industry, particularly in developed countries (Khairudin et al., 2019). IOT-based PLC control is widely used to control machine functions automatically and semi-automatically. It is a computerized microprocessor-based controller that implements discrete or sequential logic in an industrial environment. Online PLC control for mechanical relay functions, timers and counters where each function is integrated in one PLC controller unit can be done with internet facilities. It is widely uses in the industry using several programming languages such as ladder diagram (LD), instruction list (IL), sequence function chart (SFC), function block diagram (FBD) and structured text (ST) (Yakimov et al., 2019). The process of uploading the completed program is done online, using the Factory I/O. Once uploaded, the movement simulation can be seen by the students using Arduino and Factory I/O software through the Open Platform Communication (OPC) server. This clearly helps the students to understand better upon seeing the results on the consequences of every command first-hand. Therefore, the use of PLC at an early stage, especially for students, is important before entering the real world of work (Rusimanto et al., 2019). The rapid transition into the IR4.0 combined with advancement of simulation technology have been widely utilized in the military and medicine fields. The success of such implementation proves that the education field can equally benefit from such technology. This will evidently

make teaching and learning interesting and ultimately more effective without involving the purchase of expensive equipment.

4. Result and Discussion

4.1 Level of Teachers' Knowledge

Based on the response, respondents gave the highest response on item B4 which is *Curriculum reformation should include feedback from teachers to ensure the effectiveness of PdP*. The individual mean score and standard deviation for item B4 are 4.66 and 0.479 respectively. Meanwhile, item B10 which is the *Involvement of curriculum stakeholders in giving input for curriculum reformation should be done continuously* and has the lowest mean which is 4.36 and a standard deviation of 0.631. Overall, 11 items indicate that the mean value score on the teachers' knowledge in curriculum reformation stated at the highest level of interval mean score which is 4.5127 with a standard deviation of 0.43878.

4.2 Level of Teachers' Understanding

On the level of teachers understanding aspect, most of the respondents gave the highest response on item C4 which is, *I understand the Course Learning Outcomes (CLO) that have been developed* with a mean value of 4.30 and a standard deviation of 0.544. In contra, item C3, *I understand the mapping of the MQF Cluster to PLO that has been developed* has the lowest mean score with mean value and standard deviation of 3.96 and 0.605 respectively. Overall, 17 items indicate that teachers understanding of curriculum reformation were stated at a high level of interval mean score with a mean value of 4.1156 and a standard deviation of 0.40240.

4.3 Relationship Between the Level Of Knowledge And Understanding Of Teachers

Table 5 shows the results of the Pearson Correlation test for the relationship between teachers' knowledge and understanding. A significant relationship exists between teachers' knowledge and understanding, with a p -value of 0.002. While the r value obtained was as high as 0.426. It shows that there is a strong positive and significant relationship between teachers' knowledge and understanding. This situation means that the higher the teachers' knowledge of curriculum reformation, the higher the teachers' understanding of it. In conclusion, the null hypothesis is rejected at a significant level of 0.01.

Table 5. Pearson Correlation test for the relationship between teachers' knowledge and understanding

		Understanding
Knowledge	Pearson correlation (r)	0.426**
	Sig. (2-Tailed) (p)	0.002

** . Correlation is significant at the 0.01 level (2-tailed).

The findings of the study show that the level of knowledge of teachers on curriculum reform is very high, with a mean of 4.512. These findings align with the results from Jamaludin (2021) who studies teachers' readiness and attitudes towards education changes, which found that enthusiasm for reform and acceptance of a difference by educators is very significant. It is the teachers' willingness to work hard to apply a reform in the educational organization successfully. Teachers' knowledge and skills are vital and are the primary drives for curriculum development (Zohar, Degani, & Vaaknin, 2001). Specifically, teachers must understand curriculum reform. The curriculum modification must include the teachers to give inputs in ensuring the effectiveness of planned teaching and learning strategies. Teachers are crucial in curriculum implementation since they have the knowledge, experience, and abilities to assist in curriculum development (Alsubaie, 2016). Teachers' expertise is vital because they specialize in teaching curriculum content to achieve learning objectives.

Since the teacher should execute the curriculum to fulfil the needs of students, it may be necessary for teachers to develop lesson plans and syllabi within the scope of the supplied curriculum (Carl, 2009). Particularly, teachers can contribute to the curriculum creation process by planning in collaboration with the curriculum development team and subject matter specialists. Necessary confirmation of the university's efforts to generate graduates with relevant knowledge, values, and skills based on Bloom's Taxonomy of learning domains (Laguador & Ramos, 2014) requires the participation of industry partners in curriculum revision.

The involvement of stakeholders in curriculum reform needs core attention. This significance comes from the fact that the curriculum's stakeholders now include the industry and the market rather than just the academic side of universities and colleges (Khayriyyah & Chang, 2022).

The analysis also found that the mean for teachers' level of understanding in designing effective assessment items based on the curriculum reformation is high with a mean value of 4.11. Understanding CLO is necessary for teachers because teachers can build a T&L strategy based on their ideas and creativity through CLO. A well-structured course should demonstrate a precise alignment between the learning outcomes and the assessment criteria employed in the study; this then leads to the design of an assessment that is suited to the evaluation and to deliver the course using the most effective approach to achieve the desired results (Keshavarz, 2011).

Based on the learning outcomes (Learning Outcomes), the teaching context, learning activities, and assessment

systems must be structured so that students may successfully follow and succeed (Mahajan & Singh, 2017). As a teacher, it is a must to promote the development of high-quality learning outcomes in our students, such as a deep approach to learning, comprehension, autonomous learning, critical and creative thinking, problem-solving, and other aspects of lifelong learning (Aziz, Yusof, & Yatim, 2012).

Teachers are responsible for creating the environment and chances for students to engage in profound learning experiences that expose and enhance their abilities. Teachers should be the driver of meaningful learning, not merely the facilitators, and choose from various methods that can be blended and modified to the situation and individual pupils (Caena & Redecker, 2019). During active T&L, teachers are primarily responsible for enrichment, consultations, negotiations, and answering queries (Nur Ayuni, Naziha, & Narina, 2016). The significance of this method lies in the fact that students can regulate their learning and determine whether or not they possess specific knowledge. In conclusion, the primary attribute of active learning is engaging students in learning activities so that they do not learn passively and retain information.

The Malaysian Qualification Framework (MQF) identifies the capabilities to search, evaluate, organize, analyze, synthesize, use, and communicate information as a series of desirable learning outcomes for Malaysian higher education students (Karim, et al., 2010). Therefore, teachers should examine all the capabilities in building their T&L strategies because there is a close relationship between the elements specified by the MQF framework and the elements contained in the PLO.

The significance of the relationship between the lecturer's knowledge and their understanding in establishing a successful teaching and learning strategy must be investigated from various perspectives to be well understood. Proficiency in the field, skills in interpreting and building assessment items, instruction, and learning delivery techniques based on multiple sources and technology platforms, accurate understanding of taxonomy, and so on will significantly impact the construction of this strategy. The curriculum has to support the learning and assessment in developing the students, institutional culture, curriculum design, and learners' final practices while establishing evaluations, feedback, and coaching (Scott, 2019).

5. Conclusion

The results conclude that teachers must understand teaching goals, objectives, and reflections to be free in their different teaching contexts. Education and curricular frameworks are linked, and their mutually beneficial relationship helps both fields grow. When education is built on the foundation of an excellent curriculum, it would receive a great deal of respect. In light of this, teachers should always work to enhance their skills, not only in terms of education but also they provide students

with new information or their professional abilities throughout the learning process.

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