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Investigating the 6Cs Competency Levels in TnL at IPGKPT

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Abstract

This research is based upon a pilot study on the evaluation of the 6Cs competency development dimensions on the *Kapasiti Pedagogi Pembelajaran Bermakna (KPPB).* This approach was applied in the teaching and learning (TnL) of pre-service teachers majoring in Design and Technology (RBT), Mathematics (MT) and Science (SN) who took xxxx3152-'Digital Innovation in Teaching and Learning' subject at the Institute of Teacher Education, Technical Education Campus (IPGKPT). The 6Cs Competency is a set of skills that every pre-service teacher needs to master in order for lecturers to know the impact of TnL at the end of the subject. The *KPPB* was implemented in all academic programmes under the Malaysian Teacher Education Institute (IPGM). The implementation of *KPPB* not only requires the student teachers to achieve the learning outcomes of the majoring courses that they enrol but they also need to master the 6Cs competencies namely, character, creativity, critical thinking, collaboration, citizenship and communication skills. This study was carried out using the quantitative approach based on the adaptation of the 6C rubrics. The findings of the study show that the reliability of the items as the Cronbach-alpha diagnostic test is 0.966, which includes the percentage value of each 6C competency level obtained on the five levels of the 6Cs progression dimensions, 1. 'Limited', 2. 'Emerging', 3. 'Developing', 4. 'Accelerating' or 5. 'Proficient'. Two sub-dimensions of 6Cs that need to be the focus based on the study are, *"Character - Learning how to learn"* and *"Creativity - Asking questions using accurate inquiry questions".* Hence, IPG lecturers must focus more on helping the pre-service teachers to master their learning by applying meaningful pedagogical strategies during TnL.

Keywords: KPPB, 6Cs Competencies, Digital Innovation

Introduction

In line with the VUCAH (volatility, uncertainty, complexity, ambiguity, and hyper-connected) world today, if we want to produce pre-service teachers who can thrive and think in new situations, we must ensure that they are well-equipped with the 6Cs competencies. Being able to acknowledge how important learning is, when and where learning is, how it is fostered, and by what means can it be measured to attain success in TnL are crucial skills to be taught to the pre-service teachers. Many of these skills have not been fully grasped by the pre-service teachers right to the day when they leave the teacher training centres. Thus, a

more meaningful TnL strategy needs to create an environment that challenges, provokes, stimulates, and celebrates the learning experience of the pre-service teachers.

Concerning the various TnL strategies recommended by academicians, one of the strategies of the new learning pedagogy process, is the New Pedagogy of Deep Learning (NPDL), introduced by Michael Fullan with his fellow researchers (Fullan et. al., 2018). The research effort started several years ago, focusing on how students can achieve meaningful learning in their studies. The new approach formulates practices and dimensions to assist the learning process so that students can develop important skills and attain global competency respectively. The conclusion of the study disclosed the importance of the TnL strategy, through which students can achieve the six global 6C competencies namely; 'Character', 'Citizenship', 'Collaboration', 'Communication', 'Creativity' and 'Critical thinking'.

Based on extensive research done by scholars, the NPDL approach has been adopted as one of the TnL strategies in the academic program by the Malaysian Teacher Education Institute (IPGM). The approach has been put to practice as one of the new capacities in the TnL implementation strategy (Karim et al., 2021; Mohd Shah & Kamarudin, 2022) on campus. This idea integrated the application of NPDL with other models and is known as the *Kapasiti Pedagogi Pembelajaran Bermakna (KPPB)* model, focusing on holistic and comprehensive TnL approach to improve pre-service teacher's learning strategies. Consequently, three Teacher Education Institutes which includes IPGKPT have undergone *KPBB* in 2018 as a pilot study. In the year 2020, the implementation of *KPBB* expanded to all 27 campuses throughout Malaysia (Karim et al., 2020). The implementation of the TnL process on campus is intended to strengthen the quality of pre-service teachers in today's digital era. The *KPPB* approach is aligned to the curriculum programme to encourage pre-service teachers to create new knowledge and connect with the real world using digital technology so as to achieve the 6Cs global competency. IPGM has also adapted the 6Cs competency rubrics based upon on the previous study.

However, naming the 6Cs competencies as a step towards clarity which focus on the TnL process does not help lecturers, pre-service teachers, or learning partners to have the same understanding of its meaning. As a result, a pilot study was conducted on the application of *KPPB* for the subject xxxx3152 `Digital Innovation in Teaching and Learning' in IPGKPT. This paper intends to further discuss the findings of items in the 6Cs competency dimensions that are slightly lower, namely the ‘character' and 'creativity' dimensions. The mean values of both items are at ‘accelerating level’ which is level 4 as compared to other indicated dimensions. Moreover, this study also focuses on the level of achievement of 6Cs competencies that have not yet been carried out.

The study is important as a reference for lecturers and pre-service teachers to realize the goals of the TnL which emphasize a concerted effort to meaningful learning. The success of the TnL not only depends on the efforts to achieve the educational program as a whole, but also to make the 6Cs competency levels achievable at its highest level of dimensions. Thus, this study is of significance not only to the subject xxxx3152 but also as a frame of reference to other subjects as well.

Research Background

KPPB outlines six dimensions of global competency, that explain the skills and attributes that supposedly be acquired by every pre-service teacher, that is character, citizenship, collaboration, communication, creativity, and critical thinking, as cited by Fullan et. al. (2018). *KPPB* emphasizes the creation and use of new knowledge in real life, establishing new learning

partnerships between and among pre-service teachers and lecturers, expanding the learning environment by moving beyond the traditional classroom without counting the time, or space, and not to forget including people either inside or outside the classroom as a catalyst to build a learning approach with the advantage of digital technology anywhere, anytime. All these by no means tend to accelerate and deepen the learning process and experience gained by the pre-service teachers. In this study, the 6Cs rubrics are used to assess the level of learning development ability of pre-service teachers taking the xxxx3152- 'Digital Innovation in Teaching and Learning'. Each learning development competency is identified in terms of development aspects of the pre-service teachers learning to provide a complete picture of the competencies, skills, and attitudes, and also the achievement of the progression of 6Cs competency levels.

Innovation, on the other hand, refers to updating or improving something by using creative and critical thinking skills to generate a solution to a problem. Digital innovation is one of the studies that focuses on using technology to reduce operating costs, improve the delivery of quality products, simplify product design and development, and speed up the service management processes (Mohamad Yusoff & Hanif, 2019). Implementing innovation in TnL using digital tools with creative ideas through various learning strategies is supposed to facilitate a more effective learning engagement besides diversifying teaching resources. In this study, through the subject xxxx3152-'Digital Innovation in Teaching and Learning', the pre-service teachers not only have to explain the concept of the innovation process, but they also have to generate ideas to develop the TnL innovation resources, starting from preparation, development, and implementation of innovation for TnL resources. This includes conducting the innovation TnL showcases and evaluating the TnL products according to their objectives. These are all done in the hope that the pre-service teachers can generate ideas and creativity to improve the quality of teaching and contribute to the advancement of the development of economical and innovative TnL resources.

Methodology

108 students from three major intakes in 2019, who took the xxxx3152 subjects have been identified. Based on the population, a total of 81 pre-service teachers were selected as respondents based on Krejcie and Morgan's sample size (Krejcie & Morgan, 1970). Meanwhile, the research instrument consisted of a set of items which consisted of 30 questions and was further divided into six components of the 6Cs competency, aforementioned in the background of this study. Respondents must respond to the dimensions of 6Cs competency progressions either, 1. 'Limited', 2. 'Emerging', 3. 'Developing', 4. 'Accelerating', or 5. Proficient. The Cronbach alpha value obtained was 0.966 (Mohd Shah & Kamaruddin, 2022). This indicates that the reliability of the item, according to Lim (2007), is very good. Table 1 shows the numbers of 6Cs Competency items using the IPGM adapted rubrics.

Table 1
The number of items according to the 6C competency construct

Construct	**Item list**
Character (4 items)	A1, A2, A3, A4
Citizenship (5 items)	B1, B2, B3, B4, B5
Collaboration (5 items)	C1, C2, C3, C4, C5
Communication (5 items)	D1, D2, D3, D4, D5
Creativity (5 items)	E1, E2, E3, E4, E5
Critical Thinking (6 items)	F1, F2, F3, F4, F5, F6

The data collected were further analyzed using Ms Excel software to determine the frequency, percentage, and mean value of the developmental dimension levels for each 6Cs competency. The interpretation of the mean score for this study was based upon the five levels of the 6Cs competency progressions.

Findings

Table 2a and 2b illustrate the demographic profiles of the respondents. A total of 81 pre-service teachers, consisting of 33 males (40.74%) and 48 females (59.26%) took part in this research. Table 2b, on the other hand, depicted the breakdown of the respondents' according to their major options with 34 (41.97%) majoring in Mathematics (MT), 26 (32.10%) in Science (SN), and 21 (25.93%) in Design and Technology (RBT).

Table 2a
Profile of Respondents based on Gender

Gender	Frequency, f	Percentage (%)
Male	33	40.74
Female	48	59.26
Total	81	100.00

Table 2b
Profile of Respondents based on Major Options

Major	Frequency, f	Percentage (%)
Mathematics (MT)	34	41.97
Science (SN)	26	32.10
Design & Technology (RBT)	21	25.93
Total	81	100.00

The data of this study was analyzed descriptively based on frequency (f) , mean score, and percentage (%) using Ms Excel. To determine the dimension of deep learning progression based on the 6Cs competency, Table 3 shows the mean scores based on a five-point scale.

Table 3
Mean Scores Interpretation for a five point scale

Mean Score	0.00 - 1.50	1.51 - 2.50	2.51 - 3.50	3.51 - 4.50	4.51 - 5.00
Dimension	Limited	Emerging	Developing	Accelerating	Proficient

Source: Karim et. al. (2021)

The findings of this study are in line with the continuation of the researcher's previous study. It examines the level of deep learning progression based on the mean of 6Cs competency

in the subject implementation. These findings show all six competencies are in the dimension of “Accelerating”. However, for the competency of “Character” and “Creativity”, the results show that there are two items, namely items A1 and E2, which are in the "Developing" dimension as shown in Table 4.

Table 4
Mean Item of 6Cs Competency and Deep Learning Dimension Interpretation

Competencies Construct	**Item**	**Mean**	**Average**	**Dimension of Deep Learning Progression**
Character	**A1**	**3.22**	3.62	Accelerating
	A2	3.74		
	A3	3.67		
	A4	3.86		
Citizenship	B1	3.51	3.75	Accelerating
	B2	3.75		
	B3	3.69		
	B4	3.65		
	B5	3.90		
Collaboration	C1	4.00	3.85	Accelerating
	C2	3.94		
	C3	3.81		
	C4	3.79		
	C5	3.86		
Communication	D1	3.72	3.73	Accelerating
	D2	3.74		
	D3	3.73		
	D4	3.69		
	D5	3.77		
Creativity	E1	3.60	3.60	Accelerating
	E2	**3.48**		
	E3	3.74		
	E4	3.65		
	E5	3.53		
Critical Thinking	F1	3.75	3.60	Accelerating
	F2	3.65		
	F3	3.53		
	F4	3.59		
	F5	3.54		
	F6	3.74		
Average Mean			3.69	Accelerating

Analysis of the data obtained in Table 4 in line with the reference to the 6Cs competency based on deep learning progression dimension, 1. ‘Limited’, 2. ‘Emerging’, 3. ‘Developing’, 4. ‘Accelerating’, or 5. ‘Proficient’, which indicates that the pre-service teachers have achieved all the 6Cs competency at the fourth level, which is the “Accelerating” level with an overall mean value of 3.69. The average mean of 3.69 indicates that the progression of deep learning

for pre-service teachers, especially those who used digital innovation in TnL, had reached the "Accelerating" dimension.

The competency with the highest mean value is “collaborative” (3.85), followed by “citizenship” (3.75), “communication” (3.73), “character” (3.62), “creativity” (3.60) and “critical thinking” (3.60) Both creative and critical thinking were with the same mean values. This shows that the pre-service teachers can achieve all the 6Cs competency during the subject by developing the TnL digital innovation resources as well. Henceforth, within the parameters of collaborative competency, they can collaborate with each other in a group by improving interpersonal and group skills: having social, emotional, and cross-cultural skills. Moreover, they are also able to endure challenges and manage the dynamics of collaborative competency while utilizing the digital tools. In the long run, upon achieving these competencies, the pre-service teachers may also improve their pedagogical strategies to implement an excellent TnL in the future.

Although the average overall mean value of each 6C competency shows that pre-service teachers are on the dimension of Accelerating (between 3.51 - 4.50), based on the analysis of the mean value of each item, there are two items that are still on the Developing dimension, namely item **A1 Character** (3.22) and item **E2 Creativity** (3.48). Tables 5a and 5b show the construction of the answer choices and the mean scores obtained for items A1 and E2 in more detail.

Table 5a refers to the mean score of Character A1: Learning how to learn, (3.22) which is only in the “Developing” dimension. This is because the data shows that 15 respondents (18.52%) mostly chose dimension 1 "*I still need tutoring from the lecturer to learn* " and a few chose dimension 2 "*I started designing my TnL in collaboration with my lecturer* ". This data has an impact on the overall findings of the study. While 30 respondents (37.04%) chose "*I can recognize what and why I need to learn*". 36 respondents (44.45%) mostly chose "*I am good at creating new learning experiences* " and only a few chose "*I am good at solving problems and generating new knowledge that impacts my life*". All these indicate that quite a number of pre-service teachers are still in need of guidance from lecturers to begin with. They also need to be facilitated in learning to collaborate in designing innovative TnL resources, identifying what and why it is necessary, helping in designing new learning experiences and also solving problems in order to generate new knowledge that has an impact on learning.

While in Table 5b, for item **E2: Creativity - *Questioning using the right inquiry questions***, 11 respondents (13.58%) chose dimensions 1 and 2 i.e. “*I am able to formulate an inquiry process if explained by the lecturer but am not able to explore issues*” and “*I still need guidance and support to explore the real issue*”, while 30 respondents (37.04%) chose dimension 3 and another 36 respondents (44.45%) chose dimension 4 and 5. These findings indicate that there are preservice teachers who still need to be guided to spark their curiosities in designing their TnL digital innovation resources. This starts from the guidance to identify innovation issues, and support in exploring real issues in TnL. They also need to be guided in identifying problems and procurement and to be able to see from various perspectives until they are good at understanding the 'big ideas', formulating problems, and building provocative questions including exploring real issues.

In both findings, there are a few pre-service teachers who still feel that they have not yet mastered the 6Cs global competency which are "Learning how to learn" and "Questioning using the right inquiry questions" according to their self-capacity and autonomy. In consequence, lecturers need to recheck these elements of 6Cs so that meaningful learning

can take place. In the long run, lecturers should also assist the pre-service teachers throughout the learning process.

Table 5a
Mean score for item A1

A1: Character: Learning How to Learn	Frequency, f	%
1. I still need tutoring from the lecturer to learn	11	13.58
2. I started designing my TnL in collaboration with my lecturer	4	4.94
3. I can recognize what and why I need to learn	30	37.04
4. I am good at creating new learning experiences	28	34.57
5. I am good at solving problems and generating new knowledge that impacts my life	8	9.88
Total	81	100
Mean score (Interpretation)	3.22 (Developing)	

Table 5b
Mean score for item E2

E2: Creativity: Questioning using the Right Inquiry Questions	Frequency, f	%
1. I can formulate an inquiry process if explained by the lecturer but am not able to explore issues	3	3.70
2. I still need guidance and support to explore the real issue	8	9.88
3. I am good at identifying problems and designing inquiries	28	34.57
4. I have strong and provocative inquiry skills in identifying issues and looking from multiple perspectives	31	38.27
5. I am very good at understanding "big ideas", formulating problems, building provocative questions, and exploring real issues	11	13.58
Total	81	100
Mean score (Interpretation)	3.48 (Developing)	

Conclusion

The quality of instructional delivery is influenced by the lecturer's ability to design TnL in meaningful ways, including coordinating the curriculum, knowledge, teaching strategies, tools, and assessment methods. This study discusses how a pre-service teacher who took the xx 3152-'Digital Innovation in Teaching and Learning' developed 6Cs competency in creating a digital TnL innovation products resource. Assessing a pre-service teacher's proficiency in completing meaningful tasks indicates that the pre-service teacher is apt to the progress dimension. However, providing pre-service teachers and lecturers with the same understanding of designing and measuring meaningful learning outcomes requires a holistic and sustained effort to achieve excellent grades in the future. In overall, there is still a need for further improvement for all competencies up to the highest development dimension which is, the 'excellent' level. This undoubtedly represents a holistic and an ongoing commitment in all aspects of requirements at the early stages of planning, implementing, and evaluating the TnL.

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