

# 6C Levels among Trainee Teachers upon the Implementation of NPDL in a Teacher Training Institute

**Ellyza Karim<sup>a\*</sup>, Nor'Azah Ahmad Safran<sup>b</sup>, Noor Haslinda Shuib<sup>c</sup>, Haliza Hamzah<sup>d</sup>, Norhayati Hashim dan Mohd Paris Salleh<sup>e</sup>, <sup>a,b,c,d,e</sup>IPG Kampus Pendidikan Teknik, Bandar Enstek, Negeri Sembilan, Malaysia,**

This study aims to measure the six global competencies (6Cs) among trainee teachers. It follows the implementation of the New Pedagogies for Deep Learning (NPDL), in a Malaysian Teacher Training Institute. NPDL is a commitment to building a learning relationship between and among students, lecturers and the community, based on current learning development. Learning partnership is emphasised throughout the implementation. NPDL consists of three main areas, namely competency, learning design and learning environment. It focuses on designing and developing the pedagogical capacity that encourages students to develop deep learning competencies: citizenship, character, communication, creativity, collaboration and critical thinking. The standard 6Cs setting is to bridge the gap of current learning development. Teacher-centred approaches are widely practised, with one-way communication and students as mere listeners; hence students become passive. Traditional pedagogical and teacher teaching styles affect students' interest in teaching and learning. Thus, NPDL was introduced as one of the latest pedagogical-centred capacities, which enhances student-centred learning as well as pedagogical aspects both across the curriculum and between disciplines. In this study data was analysed from an online questionnaire of 84 respondents at a Teacher Training Institute, from Semester 3, 5 and 7, among the courses in Science, Mathematics, RBT and TESL. The overall mean of the 6Cs is ( $M = 3.41$ ;  $SD = 0.74$ ), where, collaboration is ( $M = 3.61$ ;  $SD = 0.84$ ), citizenship ( $M = 3.51$ ;  $SD = 0.73$ ), critical thinking ( $M = 3.36$ ;  $SD = 0.83$ ), character ( $M = 3.35$ ;  $SD = 0.80$ ), creativity ( $M = 3.31$ ;  $SD = 0.84$ ) and communication ( $M = 3.29$ ;  $SD = 0.80$ ). The norm comparison shows that collaboration, citizenship, critical thinking and character are above the norm, while creativity and communication are below the norm. This indicates that NPDL has successfully increased four out of six global competencies of 6Cs for trainee teachers, while the other two should be given attention for future enhancement.



**Key words:** *NPDL, 6Cs of global competencies, trainee teachers.*

## Introduction

The Ministry of Education (the Ministry) has launched Malaysia Education Blueprint 2013 – 2025 (the Blueprint). It is to apprehend national educational transformation, by preparing quality education for every child. Transformational education content has emphasised improving school quality and students' excellence. At the end of the first phase of the implementation of the Blueprint, a school empowerment programme will be introduced, known as Transformational School Programme 2025 (TS25).

With TS25, the Ministry has worked to exhibit the content of the Blueprint, with a specific focus on school quality and student excellence. Quality teachers is one vital factor to transform schools. In this regard, the Teacher Training Institute (IPG) is recognised as playing a significant role. Thus, New Pedagogies for Deep Learning (NPDL) are proposed in the IPG, to strengthen teacher training and be aligned with global trends. Furthermore, NPDL is proven to be in accordance with the New Narrative of Educational Practice 2019. It supports pedagogical practices, as one of the needs for meaningful, fun and twenty-first century learning, classroom-based assessment, featuring TS25.

Fullan et al. (2017) proposes New Pedagogies for Deep Learning, as a commitment towards forging new learning partnerships between and among students, lecturers and communities. Thus, learning partnerships are a distinctive feature of NPDL. NPDL consists of three main constructs; competency, learning design and learning condition. NPDL focuses on designing and developing pedagogical capacities that cultivate the 6Cs of global competencies – Character, Citizenship, Collaboration, Communication, Creativity and Critical Thinking. Deep learning is inclusive for all. It instils confidence and perseverance, and provides opportunities for all students to succeed, despite the learning challenges perceived by others or by individuals themselves. Equity in learning cannot be achieved in the short run, but moving toward equal outcomes should be an aspiration, through the implementation of NPDL. Consequently, NPDL is potentially designed towards producing *Guru Berjiwa Pendidik* which is parallel with the IPG mission.

The new teacher training proposes further measures. Lecturers together with trainees have the opportunity to be a co-designer and co-learner (Fullan et al., 2018), when implementing project-based learning that interrelates several courses with one big idea. This practice is parallel with the Ministry aspiration of changing the national education landscape, to be on a par with international standards, through the TS25 initiative.

Briefly, through NPDL, lecturers build pedagogical capacities by giving more emphasis towards designing and contextualizing new knowledge in lives, and not merely disseminating knowledge. They intertwine the new learning with their peers, lecturers, and experts from the community in a specific field through exploration, and the creation and utilization of knowledge. Pedagogical capacities expand the learning environment by moving beyond the traditional classroom walls to use time, space and people within and beyond the classroom walls as a catalyst for building new knowledge and creating a robust culture for learning. NPDL leverages digital technology ubiquitously, to accelerate and deepen learning through engagement directly and online.

### **Statement of the Problem**

Trainee teachers have yet to be optimally competent. This is due to lack of readiness in coping with real life challenges. It has led to work burdens and conflicts, role ambiguity, and conflicts among colleagues (Layang & Jamaludin 2018; Nurazidawati, Kamisah & Tuan Mastura 2011; Saedah & Mohammed Sani 2012; Scott 2014; Serhat 2019; Tengku Sarina Aini & Fatimah Shahida 2018). Poor practice of pedagogy, in teaching and learning practices, are at fault. Therefore, producing effective trainee teachers is competency development should be given more emphasis, whilst preparing them to cope with work pressures and twenty-first century challenges.

The development of trainee teachers' competencies relates closely to theory and teaching skills taught in college. They will apply the theory and teaching skills learnt during their practicum. This statement is supported by several studies that showed teachers are still applying the old pedagogy which focuses on content mastery, instead of instilling thinking skills which affect students' interests (Arniza & Zamri 2018; Kamarul, Farah & Hasnah 2017; Suzlina Hilwani & Jamaludin 2015). Besides that, in 2011 the Higher Education Leadership Academy (AKEPT) studied 125 teachers and 41 schools around Malaysia. It found that only 50% of lessons are delivered in an effective manner. This means that the lessons did not sufficiently engage students, and followed a more passive, lecture format of content delivery. The AKEPT study showed that teachers focus on achieving surface-level content understanding, instead of higher-order thinking skills (Radhiah, Rasid and Azhar, 2016). If this continues, it will affect the Ministry aspiration to produce holistic individuals as curriculum disseminators for students at the school level.

In IPG, lecturers are the curriculum disseminators. Thus, their point of view should be recognized in designing the IPG curriculum and trainee teachers' competency. A research was conducted by Fauziah, Abdul Rahim, Hafsa and Halimatussasadiyah (2015) into lecturers' perception in implementing science curriculum degree programmes, and PISMP in IPG Malaysia. It shows that lecturers play a key role as information providers. A research of



105 participants among lecturers from 20 IPG Malaysia also highlighted the importance of lecturers' perspectives, in deciding whether PISMP programs should continue into the future. Their expertise is highly recognized in developing teaching competency. In this regard, the implementation of NPDL with 6Cs global competencies – Character, Citizenship, Collaboration, Communication, Creativity and Critical Thinking (Fullan et al., 2018) - could be strengthened by the lecturers, to meet the competency standard set by IPGM.

The next analysis focuses on designing the 6Cs as valid assessment standards, to evaluate trainee teachers' competencies holistically. The competency standard is expected to be dynamic across the curriculum, and interdisciplinary (Fauziah et al., 2015). Moreover, the learning competency acquired by the trainee is to prepare them with multi-added skills and character building (Goh, Qismullah & Wong, 2017; Masyuniza, 2015; Nurazidawati et al., 2011).

The researchers' analysis found discrepancies in the aspect of competency. Therefore, it should be embedded in teachers' training, to prepare them for the real challenges in school. The researcher anticipates that the result from the competency study could be used by other IPG, especially the Ministry, to assist in producing competent trainee teachers.

## **Literature Review**

A study by Prensky (2001) concluded that the way children learn today is very different, compared to their teachers. In this regard, to study the development of students' learning, researchers must use relevant surveying tools. The 6Cs are seen as a relevant standard for the development of children's learning today.

According to Burden & Byrd (2015) teaching and learning occur when pupils are aware that their learning is meaningful and makes a real difference to them. Richards and Rodger (2014) support this, stating that a good teacher is able to increase students' interest, able to explain clearly, uses effective teaching methods, and creates fun learning activities. Student outcomes are a key factor in determining the effectiveness of an institution or school.

The achievement of student outcomes requires not only an academic focus. It also requires attention to their appearance and personality, as well as to personal citizenship. Stoll and Fink (2000) have formulated the proposition that an effective school or institution will produce the student who is not only academic but also has a strong, collaborative, creative and critical mind, strong citizenship and is a good communicator. These elements are in line with the 6Cs element which is the reference for standard NPDL learning development.



Stacey (1999) found that collaborative activities in small groups will make the students more committed to interact, and to communicating and learning effectively. During the activities learning occurs where the students collaborate, give and get feedback. They can share and clarify ideas through communicating within the group, either online or verbally. Discussion and sharing through this medium will stimulate an active environment for building new concepts and ideas, and for learning more effectively. Discussion among students can create meaningful experiences, to help them meet the needs of knowledge and professionalism, and not only focus in their personal experiences in their institutions (Mitra, 2004).

Abdul Rashid and Amat Johari (2012) stated that in communication, the necessary knowledge does not only involve formulas or rules of interaction. Instead it is also cultural regulation, which is the basis for the context and content of communication. Novice teachers should have stressed to them the need for communication skills, in a stimulating, conducive classroom environment, and for enhancing an effective student – teacher relationship. Teachers need to have high-level communication skills, not only to improve their own quality, but also to enhance the professionalism of education.

Mynbayeva (2017) believes that professional activities in teaching and learning are one of the most important pedagogical principles, in the twenty-first century. This encompasses innovative aspects that rely on teachers' personality, as well as an attitude of pedagogical efficiency and skill that can stimulate creativity among teachers and students. For example, the construction of an 'i-Think' thinking map helps students stimulate their thinking capability. This method also indirectly enhances their potential and creates creative and innovative human capital, and ability to think at a higher level, thus achieving the National Education Philosophy (Muhammad Sidek, 2013), rather than just transmitting knowledge that already exists.

Through critical thinking, students are reinforced in exploring different perspectives on the impact of an idea or solution, from a community and environmental perspective. These practices also help students to develop analysing skills, as well as the ability to decide upon expansive information around them. Based on this situation, Ruslan and Nyet (2015) run critical thinking tests in Science for Year Five pupils, using Problem-Based Learning. Their tests confirmed that the three best constructs in critical thinking study are; making contrasts, analysing, and identifying causes and consequences. Thus, it can be construed that students who are able to think critically will certainly dominate these three constructs. Therefore, critical thinking mastery can be attributed to higher order thinking skills (HOTS).

Based on earlier studies in this literature review, it can be formulated that the six elements of the 6Cs, referred to in measuring the competency level of the present trainee teachers, are



highly relevant elements. It will prepare them to endure inevitable challenges in education that requires physical, mental and emotional strength.

## **Objectives**

The objectives of this study are as follows:

1. To determine the extent of the validity and reliability of a 6Cs questionnaire.
2. To identify the level of 6Cs among IPG trainee teachers.
3. To identify the profile of 6Cs among IPG trainee teachers.
4. To determine the difficulty level of 6Cs items.

## **Research Questions**

The study was carried out to fulfill the following research questions:

1. What is the validity and reliability of the 6Cs questionnaire in terms of
  - i. item validity,
  - ii. item reliability,
  - iii. person reliability?
1. What is the level of 6Cs among IPG trainee teachers?
2. What is the 6Cs' profile among IPG trainee teachers?
3. What is the hardest and easiest item in the 6Cs questionnaire?

## **Methodology**

This research was conducted to study the level of the 6Cs, among IPG trainee teachers, upon the implementation of NPDL. Research methodology is important in obtaining valid and reliable results, to resolve research questions and achieve research objectives. Therefore, this part will outline the research method, sampling and instrument validation.

## ***Research Design and Instrumentation***

This study was quantitatively administered based on survey design. Preparation of suitable items is essential for the respondent to answer convincingly and to return the questionnaire pleasingly. According to Mohd Majid Konting (2004), respondents will continue to respond to the instrument if the submitted items are easily read and understood. In addition, items

should be clear, short, require low thinking and low-analysing feedback, as well as being simple and easy to reply to.

To answer the research items, a questionnaire that consists of two sections was newly developed. Section A contains items about the respondent's background. Section B contains 30 items on 6Cs elements. The six elements are represented by four character items, five items from each of the citizenship, collaboration, communication and creativity elements, and six critical thinking items.

A questionnaire containing a five-point scale was modified, using the 6Cs rubric of deep learning competency progression issued by IPGM. It includes five dimensions of 6Cs. Their dimensions range from limited to emerging, developing, accelerating and proficient. Surveys were carried out online, upon samples in a population. The selected samples possess the characteristics of the research population, to then generalise the studied population.

### ***Research Sample***

A total of 95 teachers involved in the NPDL implementation at one IPG became the sample. Questionnaires were administered online using a *Google form*. Only 84 samples are retained. Eleven others are considered outliers. Therefore, items are analyzed based on feedback from 84 samples. According to Rasch model measurement, for polytomies data a group of 50 people is minima, as it reaches the confidence degree of 99 percent (Linacre, 1994). The Rasch measurement model also analysed the samples. Thus, person reliability and separation were also revealed by this study. Table 1 shows demographic information from the 84 respondents involved in this study, in terms of gender, semester of study and coursework.

**Table 1:** Respondent's demographic information

<b>Profile</b>	<b>Category</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>	<b>Sum</b>
Gender	Male	34	40.5	84 (100%)
	Female	50	59.5	
Semester of study	Semester 3	47	56.0	84 (100%)
	Semester 5	9	10.7	
	Semester 7	28	33.3	
Coursework	Science	16	19.0	84 (100%)
	Mathematic	27	32.1	
	RBT	36	42.9	
	TESL	5	6.0	

### ***Data Analysis Technique***

Data analysis involved descriptive statistics and inferential statistics. The IBM SPSS Statistics version 22.0 was used for data entry, storage, retrieval and the generation of descriptive and inferential statistics. To test suitability, validity and reliability of items, the Rasch measurement model was used. Thus, the Winsteps software version 3.72.3 was employed to analyze the data. To gauge the competency level of 6Cs among trainee teachers, five categories of mean score (Mohd Najib 2003), derived from the questionnaire, were compared to the dimensions of a standard rubric as shown in Table 2. Subsequently, the profile was formed using mean comparison within the norm on the cut score at the fiftieth percentile. Using Rasch measurement analysis, other than the validation aspect, the outcome of the item difficulty levels was also discussed by referring the person-item map distribution.

**Table 2:** Mean score interpretation for a five point scale

<b>Mean scores</b>	0.00-1.50	1.51 – 2.50	2.51 – 3.50	3.51 – 4.50	4.51 – 5.00
<b>Dimensions</b>	Limited evidence	Emerging	Developing	Accelerating	Proficient

**Source:** Mohd Najib (2003) and NPDL 6Cs rubric (2018)

This study is important, especially in providing exposure to researchers or instrument builders, in terms of the chosen validity and analytical method. Researchers must ensure each items are fit, with different difficulty levels, and that they are fair to every person who responds to the particular instrument. Reliability of items and person should also be viewed particularly to ensure the instrument and the samplings have high consistency. Therefore, the instrument may produce significant measurement.

### **Findings**

#### ***Demographic Information***

Table 3 shows the mean of 6Cs elements among 84 IPG trainee teachers. The overall mean of 6Cs competencies was ( $M = 3.41$ ;  $SP = 0.74$ ), with character ( $M = 3.35$ ;  $SP = 0.80$ ), citizenship ( $M = 3.51$ ;  $SP = 0.73$ ), collaboration ( $M = 3.61$ ;  $SP = 0.84$ ), communication ( $M = 3.29$ ;  $SP = 0.80$ ), creativity ( $M = 3.31$ ;  $SP = 0.84$ ) and critical thinking ( $M = 3.36$ ;  $SP = 0.83$ ). These findings indicate that the 6Cs level of IPG trainee teachers is on a developing dimension. According to the constructs, only citizenship and collaboration elements are in the accelerating dimension.

**Table 3:** Mean and standard deviation of 6Cs (n = 84)

6Cs elements	Mean	Standard deviation
Character	3.35	0.80
Citizenship	3.51	0.73
Collaboration	3.61	0.84
Communication	3.29	0.80
Creativity	3.31	0.84
Critical thinking	3.36	0.83

### ***Validity and Reliability of Instrument***

One method of evaluating instruments is Rasch analysis, a mathematical model in which validity is confirmed when items of the instrument fit within the specific Rasch analysis properties (Bond & Fox, 2015). Before we conclude the 6Cs level analysis among trainee teachers, and read the profiling and levels of items, it is important to test the validity and reliability of the questionnaire. Based on the Rasch measurement model, item polarity and item fit are measured upon the item validation of this study. In addition, the Rasch measurement model also highlighted the separation of item and person. The items separation index may display the difficulty extent of the item, while the person separation index indicated the number of strata identified capabilities in the group surveyed. Linacre (2005) recorded values of more than two as good for the index of person-item separation. If small numbers of items are able to form a large strata group, then this indicates the variable has been dispersed well and the position of items on the logit scale employs high reliability (Hussain et al., 2019).

A commonly accepted range for mean square values (MnSq) is 0.50 to 1.50 logit (Boone et al., 2014). The range of outfit MnSq among 30 items in this study is 0.61 to 1.48 logit. Table 4 shows statistical formulations of item measurements. The value of an infit MnSq of item A4 stated 1.61 logit, but this item remains accepted because the value of outfit MnSq is 1.48, which still adheres to Boone et al. (2014). The value of outfit MnSq must be given prior attention compared to infit MnSq, to determine correspondence items that measure the latent variables. As a conclusion, the items in this questionnaire belong to a good fit range.

**Table 4:** Statistics of items

Input: 84 Person 30 Item Reported: 84 Person 30 Item 5 Cats Winsteps 3.73

Person: Real Sep.: 5.69 Rel.: .97 ... Item: Real Sep.: 2.34 Rel.: .85

Item Statistics: Measure Order

Entry Number	Total Score	Total Count	Total Measure	Model S.E.	Infit Mnsq	Infit Zstd	Outfit Mnsq	Outfit Zstd	Pt-Measure Corr.	Pt-Measure Exp.	Exact Match Obs%	Exact Match Exp%	Item
1	249	84	1.06	.17	1.45	2.7	1.45	2.7	.72	.77	46.4	53.7	A1
5	266	84	.59	.17	.98	-.1	1.00	.0	.76	.76	59.5	56.5	B1
22	266	84	.59	.17	.67	-2.4	.67	-2.4	.83	.76	64.3	56.5	E3
16	272	84	.42	.17	.85	-1.0	.85	-1.0	.77	.76	61.9	57.4	D2
17	273	84	.39	.17	.81	-1.3	.84	-1.0	.81	.76	64.3	57.5	D3
20	273	84	.39	.17	.74	-1.8	.76	-1.7	.80	.76	65.5	57.5	E1
27	273	84	.39	.17	.73	-1.9	.73	-1.9	.80	.76	66.7	57.5	F3
29	273	84	.39	.17	.82	-1.2	.90	-.6	.77	.76	65.5	57.5	F5
19	277	84	.28	.17	.60	-2.9	.67	-2.4	.81	.76	71.4	57.4	D5
30	278	84	.25	.17	.81	-1.2	.81	-1.3	.78	.76	57.1	57.5	F6
3	279	84	.22	.17	.90	-.6	.93	-.4	.80	.76	63.1	57.5	A3
15	279	84	.22	.17	1.31	1.9	1.29	1.8	.63	.76	58.3	57.5	D1
18	280	84	.19	.17	.80	-1.3	.78	-1.5	.78	.76	64.3	57.8	D4
23	280	84	.19	.17	.60	-3.0	.61	-2.9	.86	.76	69.0	57.8	E4
2	281	84	.16	.17	1.09	.6	1.07	.5	.78	.76	63.1	57.9	A2
21	284	84	.07	.17	.68	-2.2	.71	-2.0	.81	.75	69.0	58.2	E2
26	284	84	.07	.17	1.07	.5	1.01	.1	.78	.75	63.1	58.2	F2
24	286	84	.01	.17	.95	-.3	1.06	.4	.74	.75	60.7	58.4	E5
13	291	84	-.14	.17	.83	-1.1	.81	-1.3	.80	.75	65.5	58.5	C4
28	293	84	-.20	.17	.72	-1.9	.71	-2.1	.84	.75	63.1	58.4	F4
25	294	84	-.23	.18	.84	-1.0	.83	-1.1	.80	.75	65.5	58.6	F1
8	296	84	-.29	.18	1.25	1.5	1.18	1.1	.69	.75	61.9	58.7	B4
7	298	84	-.35	.18	1.14	.9	1.08	.6	.70	.74	52.4	58.8	B3
10	298	84	-.35	.18	1.37	2.2	1.28	1.7	.66	.74	54.8	58.8	C1
9	302	84	-.48	.18	.95	-.2	.97	-.1	.74	.74	63.1	59.2	B5
11	309	84	-.70	.18	1.41	2.3	1.28	1.7	.72	.74	58.3	59.6	C2
12	309	84	-.70	.18	1.48	2.7	1.38	2.2	.70	.74	50.0	59.6	C3
14	309	84	-.70	.18	1.10	.7	1.10	.7	.74	.74	67.9	59.6	C5
6	311	84	-.77	.18	1.31	1.9	1.20	1.3	.65	.73	59.5	59.8	B2
4	316	84	-.93	.18	1.61	3.3	1.48	2.6	.48	.73	53.6	60.1	A4
MEAN	286.0	84.0	.00	.17	1.00	-.1	.98	-.2			61.6	58.1	
S. D.	15.6	.0	.47	.00	.28	1.8	.24	1.6			5.7	1.2	

The value of Point-Measure Correlation (PMC) must be positive and exceed 0.3 logits (Bond & Fox, 2015). In the Rasch model, PMC is used to identify item polarity. It was carried out to test whether all the items are moving in one direction within the construct (Azrilah et al., 2013). All PMC measurements for each item in this instrument display a positive index between the range of 0.48 to 0.86 as shown in Table 4. Positive items indicate that the coding of those items is working in the right direction (Wright and Stone, 2004). This kind of analysis may also expose whether an item provides a discrepant feedback to the variable (Linacre, 2005). As a conclusion, items fit in this study apply the equivalent fit criteria (Bond & Fox, 2015).

Person reliability value is recorded at 0.97 and the reliability of the item is 0.84. The internal consistency, Cronbach alpha value is 0.98. All these values can be referred to Table 5. Any reliability value which is close to one is considered consistent internally (Oon et al., 2016). This indicates that the items are supposedly measuring the 6Cs as required. Previous researchers tend to display only Cronbach alpha value in their studies. However, the advantages of the Winsteps software analysis in Rasch measurement model are the ability to analyse individual reliability and item reliability.

**Table 5:** Statistics of reliability and separation of individuals and items

Input: 82 Person 30 Item Reported: 82 Person 30 Item 5 Cats Winsteps 3.73

Summary Of 82 Measured Person

	Total Score	Count	Measure	Model Error	Infit Mnsq	Zstd	Outfit Mnsq	Zstd
Mean	101.8	30.0	.79	.30	.98	-.4	.98	-.4
S.D.	22.3	.0	1.88	.04	.53	2.4	.53	2.3
Max.	144.0	30.0	5.19	.46	2.86	4.9	2.85	4.9
Min.	49.0	30.0	-3.03	.25	.07	-6.2	.07	-6.3
Real Rmse	.32	True Sd	1.85	Separation	5.72	Person Reliability	.97	
Model Rmse	.30	True Sd	1.86	Separation	6.24	Person Reliability	.97	
S.E. Of Person Mean = .21								

Person Raw Score-To-Measure Correlation = .99  
Cronbach Alpha (Kr-20) Person Raw Score "Test" Reliability = .98

Summary Of 30 Measured Item

	Total Score	Count	Measure	Model Error	Infit Mnsq	Zstd	Outfit Mnsq	Zstd
Mean	278.3	82.0	.00	.17	1.00	-.1	.98	-.2
S.D.	15.1	.0	.46	.00	.29	1.8	.25	1.6
Max.	308.0	82.0	1.03	.18	1.63	3.4	1.51	2.8
Min.	243.0	82.0	-.94	.17	.60	-2.9	.61	-2.8
Real Rmse	.19	True Sd	.42	Separation	2.29	Item Reliability	.84	
Model Rmse	.17	True Sd	.43	Separation	2.45	Item Reliability	.86	
S.E. Of Item Mean = .09								

The value of individual and item separation indices which exceed two are considered good (Jones & Fox, 1998), while more than five categorised as excellent (Fisher, 2007). The separation index shows the number of strata among individual abilities and the difficulty of items. The individual separation index obtained for this study was 5.72 and the index of item

separation recorded 2.29. This means, respondents of this study can be divided into five strata such as students with high competency, competent, moderate competency, less competent and non-competent. Meanwhile, items can be divided into two strata such as simple items and difficult items. The person separation index aims to estimate the ability of an instrument to classify persons into several levels in a measured construct. Albeit, item separation index aims to estimate the individual's ability by separating the item difficulties into several construct levels (Wright & Masters, 2002). According to Boone et al. (2014), the value of a low individual separation index indicates that the instrument is not sensitive enough to distinguish the individuals between high and low performance. Low item separation index indicates insufficient sample size to verify the item's difficulty hierarchy.

### ***Item Difficulty Level***

The person-item map in Figure 1 shows item A1 as the most difficult item for respondents, while item A4 is the easiest item. Both are under personal competence. A1 is learning how to learn while A4 is the use of digital technology in character building. The achievement of competencies in item A1 shows that students are not yet capable of solving problems and generating life-changing new knowledge, where they found that students still need the lecturer's guidance to study.

The Independence-Dependence Field model is an indicator of cognitive style. In the theory behind this indicator, students who are self-reliant need more teacher guidance and peer support. Independent learners are more likely to be analytical and less sensitive to peer pressure or instruction during teaching. To formulate this model, Witkin (1999) identifies that students' ability to refine things in detail, from a knowledge context, is an important indicator of how they approach and interpret daily life.

INPUT: 84 PERSON 30 ITEM REPORTED: 84 PERSON 30 ITEM 5 CATS WINSTEPS 3.73

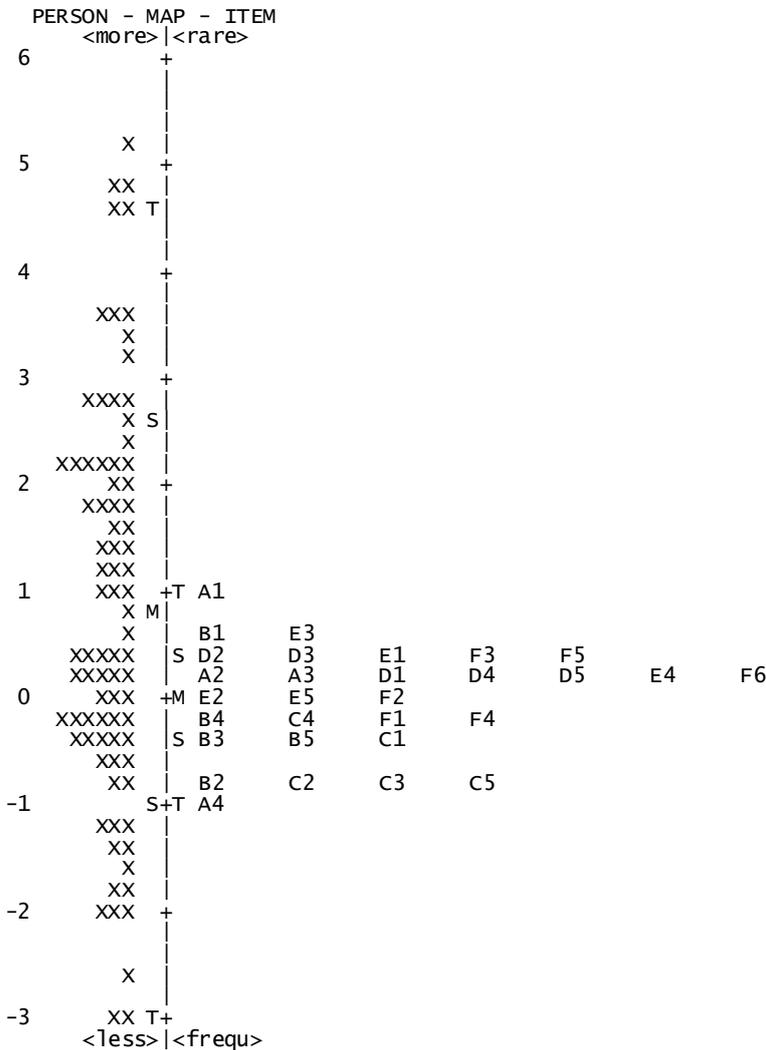


Figure 1: The person-item map distribution

The easiest item shows students are proficient in digital elements and can explain how it improves the quality of their work. Lai (2011) proposes the use of digital technology as a response to these changes. Digital technology can enhance the quality of the learning experience, if used as a communication tool that supports the construction and acquisition of knowledge. It is important for students to ‘learn about learning their own learning’ in informal situations, and to adapt themselves to formal situations. This will integrate formal and informal learning, to stimulate lifelong learning and create an innovative society. Fullan and Langworthy (2013) suggest that effective use of technology is essential to every learning process. Technology enhances the learning process and its effect depends on its application.

All five items of the collaborative element, namely C1, C2, C3, C4 and C5, are below the item mean. This demonstrates that the trainee teacher can easily achieve this element, as it is interpreted that this element is the highest accepted. On the other side, the communication elements represented by items D1, D2, D3, D4 and D5, show the hardest acceptance. It is quite difficult for the trainee teachers to perform items that relate to communication elements.

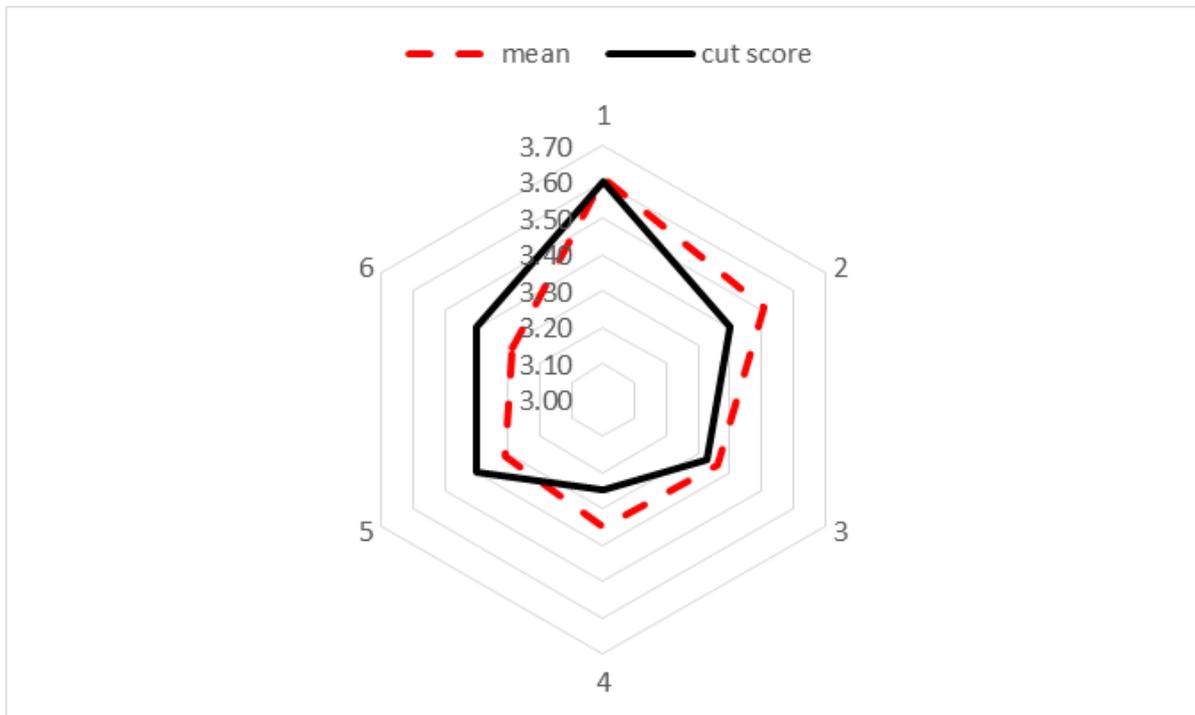
### *Cs's profile*

**Table 6:** Mean and cut score of 6Cs

<b>6Cs Elements</b>	<b>Collaboration (1)</b>	<b>Citizenship (2)</b>	<b>Critical thinking (3)</b>	<b>Character (4)</b>	<b>Creativity (5)</b>	<b>Communication (6)</b>
Mean	3.61	3.51	3.36	3.35	3.31	3.29
Cut score	3.60	3.40	3.33	3.25	3.40	3.40

The value at the fiftieth percentile becomes the cut-off value for their respective element norms. The use of percentiles means the raw data obtained from the surveyed questionnaire was transformed into a standard form of data (Mohd Effendi, 2015). A percentile approach was used to determine 6Cs level in this study. This is a simple and easy-to-interpret approach for defining a standard level. The findings shown in Table 6 represent the cut score set in the fiftieth percentile of Q2.

**Figure 2.** Comparison of mean with reference norm



The four elements in Figure 2 show that trainee teachers are above the norms of collaboration, citizenship, critical thinking and character. The other two elements of creativity and communication show that trainee teachers are below the norm. Therefore, they should strive to improve themselves in the areas of creativity and communication. The implementation of the NPDL has successfully shaped student improvements in the areas of collaboration, citizenship, critical thinking and character.

## Discussion

The discussion of this study refers to the 6Cs dimension of learning competence that is divided into five dimensions. The lowest dimension is limited evidence, followed by the emerging dimension, developing dimension, accelerating dimension and the highest which is the proficient dimension. With an overall mean of 3.41, the IPG trainee teachers are in a developing dimension. In this case, the training teacher needs to find and realise the competencies they lack, to be polished and developed. These actions are expected to enhance their strength and excellence to change lives.

The highest element of 6Cs among IPG trainee teachers is a collaboration competence with mean of 3.61. The mean indicates that the collaboration teacher trainees are in the fourth stage of development or an accelerating dimension. The findings of this study are in line with Stacey's (1999) study, which explains that students benefit from these activities. At this point, the trainee teachers have been able to explain how to work together in a team and maximise



the team members' strength. The trainee teachers can also explain the team members' attitude towards the assignment. In addition, they work effectively and support each other as team members. They are also good at exploring different perspectives without compromising the capabilities of the group, and can explain the advantages of digital elements in helping the group collaborate. This is in line with the implementation of the NPDL which requires students to collaborate on project assignments, where the support and views of team members can help build more meaningful learning. In addition to collaborating with fellow students, students can also collaborate with lecturers as co-designers and co-learners, or with learning partners in carrying out learning assignments or project-based coursework.

In discussing citizenship elements, the findings of this study are in line with those of Fullan and Langworthy (2013), Mitra (2004) and Prensky (2001). All three report that students need to be educated, to be concerned and benefit the world in thinking about matters of survival. Based on this study, it is found that trainee teachers are able to understand their role and think actively about global action. They have also shown curiosity, and have an open mind about diversity and respect for environmental sustainability. This means that citizenship competency has been actively applied by trainee teachers in making local and global solutions.

Referring to critical thinking elements, the findings of this study are in line with Burden and Byrd's (2015) study. It found that students have strong reasoning and critical thinking skills, in constructing meaning and understanding the impact of their teaching and learning. Based on this study, it was found that trainee teachers have the ability to evaluate the validity of information and argument, as well as provide a justification even though it is not robust. They have the ability to interpret and analyse good information to build meaningful knowledge, and to develop new knowledge in their own way. As to digital utilisation, trainee teachers collaborate to spark ideas, by effectively using digital tools to support shared learning. At some point, they are able to produce their own digital tools, and to explain the advantages of using these digital elements to enhance critical thinking. This means that critical thinking competency has been used optimally by the trainee teachers, in addressing their challenges or concerns. It also aligns with students' need to develop analytical skills, as well as the ability to make informed choices by students, to explore different perspectives on the impact of an idea or solution from a community and environmental perspective.

Discussing the element of character, the findings of this study are in line with the study of Mynbayeva et al. (2017) and Stoll and Fink (2000), which reported that teachers now need to grow in line with the global trend of educational development. Based on this study, it is found that trainee teachers design new learning experiences, can withstand obstacles and challenges and can plan, monitor progress, reflect and make continuous improvement in the quality of work. This means that trainees have a strong emphasis on efficiency in a variety of teaching,

informative, digital and global use approaches as suggested by other researchers. In order to polish the character and attitude of trainee teachers, it is recommended that they be inculcated and nurtured with good values.

In terms of creativity, our findings support the study of Lai (2011) and Mynbayeva et al. (2017), that emphasising creativity as a way of learning in the twenty-first century. Lai (2011) proposes that teaching, and learning cultural practices, combine formal and informal learning to produce creative and innovative students through the use of digital technology. Furthermore, Mynbayeva et al. (2017) added two aspects to the creative element; the importance of pedagogical subject development and the environmental approach to teaching. In fact, these two researchers' views have been incorporated into the element of 6Cs at IPG. However, some improvements can be made, so that these competencies can reach the level of trainee teachers' capability of assessing the potentials and resources around them. It aims to solve problems and have high leadership skills to perform tasks that inspire others. To stimulate the creativity of trainee teachers, it is recommended that Inquiry-Based Learning, Project-Based Learning, Problem-Based Learning, STEM Approaches and twenty-first century learning activities be multiplied in lectures.

The lowest element of 6Cs among IPG trainee teachers is communication, with a mean of 3.29. This indicates that the communication of the trainee teachers is only developing; that is, in the third stage. These findings are contrary to Lai's (2011) study of the aspects of communication using digital technology to enhance the learning experience. However, this finding supports those of Fullan and Langworthy (2013), Mitra (2004) and Prensky (2001), as to the importance of student voices contributing to organisational matters.

At this stage, trainee teachers use various tools and modes of communication to produce coherent communication. However, they are not yet at the very best level of communicating coherently and consistently to create meaningful experiences (Fullan & Langworthy, 2013; Mitra, 2004). This is because the trainee teacher is not yet at the stage of creating a message that can remain in the audience's mind and change how the audience thinks or acts. Well-trained teachers use a variety of strategies to integrate various forms of information. Yet they still do not know the 'big idea', and how best to present it using the right combination of tools and communication modes. This can be credited to Mitra (2004) who suggested that students be given the opportunity to make and contribute to their organisation. In addition to Fullan and Langworthy (2013), these student voice opportunities create a meaningful experience and a shared contribution to a world of interdependence.

Students need to be exposed, by observing, listening and responding to other friends or individuals. In an effort to build synergies, twenty-first century learning activities such as 'think pair share', round table, gallery walk, hot seat, 'stay-stray', jigsaw puzzle games,



forums, thorough talks or knowledge sharing, can facilitate the flow of ideas and information sharing in effective communication.

In terms of item difficulty levels, this study found that the most difficult item was A1 from the element of learning; learn how to learn. The ability to meet the competency of the A1 item shows that students are not yet capable of solving problems and generating the new high impact knowledge. This shows that they still needed the lecturer's guidance to study. This study supports Guskey's (2002) view that explained how students' progress stems from teacher awareness of changes in classroom practices, teaching approaches, the use of new teaching aids and modifications in teaching procedures. In this situation, if the lecturer modifies the mentoring pattern of the trainee teachers, then the trainee teachers themselves will be able to solve problems and generate new knowledge that is impactful in life. In addition, the findings of this study support the study conducted by Witkin (1999). It explains that there are individual differences in student learning styles that teachers should understand. According to Witkin (1999), students of 'Field Independence' rely on others as much as they need the guidance of teachers and friends.

Furthermore, this study found that the easiest item was one from the Digital Utility component, the character element. In this regard, the trainee teachers explained that they are good at using digital elements and can explain how digital elements improve the quality of their work. The findings of this study support the studies of Davis (1993), Lai (2011) and Fullan and Langworthy (2013), who found that digital elements have enhanced the quality of student learning experiences, particularly as to the work done. Lai (2011) also argues that digital technology can provide a more active and flexible learning experience, by adopting a participatory pedagogical approach. Therefore, the findings of this study prove that trainee teachers are very good at using digital elements to enhance both their learning process and the quality of their products.

## **Conclusion**

The NPDL is an effort to realise the goals and aspirations of the National Philosophy of Education, and the Philosophy of Teacher Education, in producing educative and competent teachers. The new learning environment, the new pedagogical practices, community collaboration as a learning partner, and the use of digital are the NPDL frameworks to drive trainee teachers to 6Cs global competencies. The mastery of 6Cs among trainee teachers will contribute to the nation's aspirations in achieving educational transformation. The expected result is the production of quality novice teachers that will improve the quality of the school. A quality school should focus on the dormant students, the inheritors in the next generation. Therefore, it is hoped that the successful transformation of the education system will result in



teachers of competent IPG output, in the areas of collaboration, citizenship, character, critical thinking, creativity and communication.



## REFERENCES

- Abdul Rashid Daing Melebek & Amat Johari Moain. (2012). *Sosiolinguistik dan Bahasa Melayu*. Bangi: Penerbit Universiti Kebangsaan Malaysia.
- Akademi Kepimpinan Pengajian Tinggi (AKEPT). (2011). Kementerian Pengajian Tinggi.
- Arniza Mokhtar & Zamri Mahamod. (2018). Jenis-jenis penyerapan kemahiran bernilai tambah dalam pengajaran guru bahasa melayu berdasarkan tajuk pengajaran. *Jurnal Pendidikan Bahasa Melayu*, 8: 22–32. Retrieved from <http://journalarticle.ukm.my/11833/1/163-315-1-SM.pdf>
- Azrilah Abdul Aziz, Mohd Saidfudin Masodi & Azami Zaharim. (2013). *Asas Model Pengukuran Rasch: Pembentukan Skala & Struktur Pengukuran*. Bangi: Fakulti Pendidikan UKM.
- Bond, T. G. and Fox, C. M. (2015). *Applying the Rasch Model Fundamental Measurement in the Human Sciences*. 3<sup>rd</sup> ed. New York: Routledge.
- Boone, W. J., Staver, J. R. & Melissa, S. Y. (2014). *Rasch Analysis in the Human Sciences*. Dordrecht: Springer .
- Burden, P.R. & Byrd, D.M. (2015). *Methods for effective teaching*. Boston: Allyn & Bacon
- Davis, B.G. (1993). *Tools for Teaching*. San Francisco: Josey-Bass Inc.
- Fauziah Yahya, Abdul Rahim Hamdan, Hafisah Jantan & Halimatussadiyah Saleh. (2015). Perspective of Lecturers in Implementing PISMP Science Curriculum in Malaysia's IPG. *International Journal of Evaluation and Research in Education (IJERE)*, 4(3): 130. doi:10.11591/ijere.v4i3.4503
- Fisher, J. W. P. (2007). Rating scale instrument quality criteria. *Rasch Measurement Transactions*, 21(1): 1095.
- Fullan, M. and Langworthy, M. (2013). Towards a New End: New Pedagogies for Deep Learning. Retrieved from <http://www.newpedagogies.org/>
- Fullan, M., Quinn, J. & McEachen, J. (2017). *Deep Learning: Engage the World, Change the World*. SAGE Publications.
- Fullan, M., Quinn, J. & McEachen, J. (2018). *New Pedagogies For Deep Learning : Leading Transformation In Schools, Districts and Systems*. Thousand Oaks: United States.



- Goh, P. S. C., Qismullah Yusuf & Wong, K. T. (2017). Lived experience: Perceptions of competency of novice teachers. *International Journal of Instruction*, 10(1): 20-36. doi:10.12973/iji.2017.1012a
- Guskey, T. R. (2002). Professional Development and Teacher Change. *Teachers and Teaching*, 8(3): 381-391. doi: 10.1080/135406002100000512
- Hussain, H.I., Kamarudin, F., Thaker, H.M.T. & Salem, M.A. (2019) Artificial Neural Network to Model Managerial Timing Decision: Non-Linear Evidence of Deviation from Target Leverage, *International Journal of Computational Intelligence Systems*, 12 (2), 1282-1294.
- Jones, J. A., & Fox, C. M. 1998. Uses of Rasch modeling in counseling psychology research. *Journal of Counseling Psychology*, 45(1): 30-45.
- Kamarul Md. Shah, Farah Mukhtar, Hasnah Abdullah (2017). Kemahiran generik dan pencapaian akademik dalam kalangan guru pelatih di Institut Pendidikan Guru Malaysia. *Jurnal Pendidikan Malaysia*, 42(1): 69–75. Retrieved from file:///C:/Users/UserAcer/Desktop/ RG IPGM/2017 Kemahiran Generik dan Pencapaian Akademik dalam Kalangan.pdf
- Lai, K.W. (2011). Digital technology and the culture of teaching and learning in higher education. *Australasian Journal of Educational Technology*, 27(Special issue, 8): 1263-1275.
- Layang Ugek & Jamaludin Badusah. (2018). Amalan dan masalah pengajaran literasi bahasa guru bahasa melayu ketika mengajar murid Penan. *Jurnal Pendidikan Bahasa Melayu*, 8(2): 25-38. Retrieved from <http://journalarticle.ukm.my/12595/1/176-339-1-SM.pdf>
- Linacre, J. M. 1994. Sample size and item calibration (or person measure) stability. *Rasch Measurement Transactions*, 7(4): 328.
- Linacre, J. M. 2005. Standard Errors: Means, Measures, Origins and Anchor Values. *Rasch Measurement Transactions*, 19(3): 1030.
- Masyuniza Yunos. (2015). Hubungan sikap dan persepsi murid terhadap pembelajaran bahasa melayu dengan kemahiran abad ke-21. *Jurnal Pendidikan Bahasa Melayu*, 5(2): 22-30. Retrieved from file:///C:/Users/UserAcer/Downloads/94-186-1-SM.pdf
- Mitra, D. L. (2004). The significance of students: Can increasing “student voice” in schools lead to gains in youth development? *Teachers College Record*, 106 (4): 651-688.



- Mohd Effendi Mohd Matore. (2015). Pembinaan Instrumen Kecerdasan menghadapi Cabaran (IKBAR) bagi Pelajar Politeknik menggunakan Model Rasch. Tesis Ijazah Dr. Fal, USM.
- Mohd. Majid Konting. (2004). *Kaedah Penyelidikan Pendidikan*. Kuala Lumpur: DBP.
- Mohd. Najib Abdul Ghafar. (2003). *Reka Bentuk Tinjauan Soal Selidik Pendidikan*. Skudai: Penerbit UTM
- Muhamad Sidek Said. (2013). Aplikasi menggunakan “thinking map” dalam program praktikum KPLD di Tadika Yayasan Islam Terengganu, Seberang Takir, Kuala Terengganu. Paper work presented at *Seminar Kajian Tindakan Peringkat Kebangsaan*, Tanjung Vista Hotel, Kuala Terengganu, 23-25 April.
- Mynbayeva, A., Sadvakassova, Z. & Akshalova, B. (2017). *Pedagogy of the Twenty-First Century: Innovative Teaching Methods, New Pedagogical Challenges in the 21st Century - Contributions of Research in Education*. Retrieved from 10.5772/intechopen.72341.
- Nurazidawati Mohamad Arsad, Kamisah Osman & Tuan Mastura Tuan Soh. (2011). Instrument development for 21st century skills in Biology. *Procedia - Social and Behavioral Sciences*, 15: 1470–1474. doi:10.1016/j.sbspro.2011.03.312
- Oon, P.-T., Spencer, B. & Kam, C. C. S. (2016). Psychometric quality of a student evaluation teaching survey in higher education. *Assessment & Evaluation in Higher Education*, 1-13.
- Prensky, M. (2000). Digital native, digital immigrants, Part 1. *On the horizon*, 9(5):1-6.
- Richards, J. & Rodgers, T. (2014). *Approaches and Methods in Language Teaching*. Cambridge University Press.
- Rozita Radhiah Said, Abdul Rasid Jamian & Azhar Md. Sabil. (2016). Pengetahuan dan kefahaman skop pengajaran dan pembelajaran bahasa melayu dalam kalangan jurulatih pakar pembangunan sekolah (SISC+). *International Journal of Education and Training*, 2(2): 1- 9.
- Ruslan Mapaela & Nyet, M. S. (2015). The development and validation of a test of science critical thinking for fifth graders. *SpringerPlus*, 4: 741. doi: 10.1186/s40064-015-1535-0



- Saedah Siraj & Mohammed Sani Ibrahim (2012). Standard Kompetensi Guru Malaysia. (Artikel Tidak Diterbitkan). Universiti Malaya, Kuala Lumpur. Retrieved from <http://www.fp.utm.my/ePusatSumber/listseminar/medc2012/pdf/159.pdf>
- Scott, D. (2014). Knowledge and the curriculum. *Curriculum Journal*, 25(1): 14–28. doi:10.1080/09585176.2013.876367
- Serhat, S. (2019). The investigation of primary and secondary teachers' in-class approach in terms of teaching styles and comparing it with their classroom management approach. *Turkish Studies*, 14(1): 651–666. doi:10.7827/TurkishStudies.14825
- Stacey, E. (1999). Collaborative learning in an online environment. *The Journal of Distance Education*, 14(2).
- Stoll, L., & Fink, D. (2000). *Changing our schools: Linking school effectiveness and school improvement*. Buckingham: Open University Press.
- Suzlina Hilwani Baharuddin & Jamaludin Badusah. (2015). Tahap penggunaan web 2.0 dalam pengajaran guru bahasa melayu sekolah menengah. *Jurnal Pendidikan Bahasa Melayu*, 5(2): 38–48. Retrieved from <http://journalarticle.ukm.my/9860/1/96-190-1-SM.pdf>
- Tengku Sarina Aini Tengku Kasim & Fatimah Sahida Abdurajak. (2018). Pengalaman pengajaran guru novis pendidikan islam: implikasi terhadap reka bentuk kurikulum latihan pendidikan guru. *Jurnal Pendidikan Malaysia*, 43(1): 59-66. Retrieved from <http://eds.a.ebscohost.com.ezplib.ukm.my/eds/pdfviewer/pdfviewer?vid=8&sid=59ff2731-625d-4d28-83b4-35640fa2965f%40sdc-v-sessmgr05>
- Witkin, S. L. (1999). Constructing our future. *Social Work*, 44 (1): 5-8. Retrieved from <https://doi.org/10.1093/sw/44.1.5>
- Wright, B. D. & Masters, G. N. (2002). Number of person or item strata. *Rasch Measurement Transactions*, 16(3): 88.
- Wright, B. D. & Stone, M. H. (2004). *Making Measures*. Chicago: The Phaneron Press.