

EXPLORING WHAT LEARNING STYLES GENERATION Z STUDENTS PREFER: A CASE OF INDONESIAN UNDERGRADUATES

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Abstract

This study aimed to empirically examine the preferred learning styles of undergraduate students of Generation Z based on Kolb's learning theory. The literature has highlighted unique learning characteristics of Generation Z, but empirical investigations have been inconclusive in terms of Generation Z's learning style, particularly in relation to Kolb's learning model. We applied Kolb's Learning Style Inventory, examining 423 undergraduate elementary education students in an Indonesian university. All of the participants were in Generation Z, ranging from 18 to 23 years old in 2023. Results revealed that as a whole, students preferred the learning mode of abstract conceptualization (i.e., thinking) over concrete experience (i.e., feeling), as well as preferred the mode of reflective observation (i.e., reflecting) over active experimentation (i.e., acting). Furthermore, the most common learning style was Diverging (63%); the second, Assimilating (28%); the third, Converging (5%); and finally, the fourth, Accommodating (4%). Based on these results, we discuss implications and limitations.

Keywords: *Learning style, Generation Z, Kolb's learning theory, Indonesian university, teacher education.*

1. Introduction

Since Prensky (2001) proposed the term digital natives as a feature of a new generation after Millennials, the characteristics of this generation, known as Generation Z, have been widely studied. Typically, Generation Z is considered to include those born between 1995–1997 and 2010–2012. Among their characteristics, learning and educational aspects have frequently been the focus of researchers and scholars (see Isaacs, Scott, & Nisly, 2020; Nicholas, 2019; Sayekti, Habibah, & Rahmawati, 2020; Schwieger & Ladwig, 2018; Seemiller & Grace, 2017; Yu, 2020). Conceptual and review studies on Generation Z have presented a list of unique learning characteristics (see Isaacs et al., 2020; Schwieger & Ladwig, 2018; Seemiller & Grace, 2017; Shorey, Chan, Rajendran, & Ang, 2021), and a number of empirical examinations have begun to examine Generation Z's preferred approach to learning, which is called a 'learning style', in educational institutions and learning contexts. Although numerous learning styles, models, and measures have been studied in various disciplines (Coffield, Moseley, Hall, & Ecclestone, 2004), several empirical studies on Generation Z have applied Kolb's (1984; Kolb & Kolb, 2017) learning model to identify the learning style of Generation Z (e.g., Joonas, Mahfouz, González-Trujillo, & Ruiz, 2021; Jurenka, Stareček, Vraňáková, & Cagáňová, 2018; Manzoni, Caporarello, Cirulli, & Magni, 2021). However, the research on learning styles of Generation Z has provided not only inconsistent results but also methodological limitations. Thus, it seemed important to fill these gaps. Accordingly, the aim of this study was to examine what learning style Generation Z undergraduate students prefer to employ with regard to Kolb's learning model and measure.

2. Kolb's learning model

By integrating influential learning theories and models in disciplines relevant to psychology, education, and behavior science, Kolb (1984) developed experiential learning theory. The unique feature of experiential learning theory is to focus on individuals' experiences as a central role of human learning (Kolb, 1984; Kolb & Kolb, 2017). According to Kolb's learning theory, people are required to apply four learning modes in learning situations: concrete experience (CE), abstract conceptualization (AC), reflective observation (RO), and active experimentation (AE). CE serves to grasp an experience by using

sensing and feelings, which becomes apprehensive knowledge that can be described as implicit. This knowledge is processed by the mode of RO, which requires people to carefully watch and patiently listen to others. As a result of this processing, knowledge becomes more comprehensive, which is captured by the mode of AC. The role of AC is to make human/individual experience clearly and explicitly expressed by words, concepts, numbers, and logic. Such knowledge is a foundation for testing whether it is correct or not by the mode of AE, which requires taking action, leading to a new experience. The CE mode is dialectically opposite the AC mode, while the RO mode is dialectically contrasted with the AE mode. A combination of the four learning modes leads to four basic learning styles: the Diverging learning style (CE and RO), the Assimilating style (AC and RO), the Converging style (AC and AE), and the Accommodating style (CE and AE).

3. Generation Z and learning style

To the best of our knowledge, five empirical studies have been conducted on the learning style of Generation Z applying Kolb’s learning model: the studies of Galingan (2019), Joonas et al. (2021), Jurenka et al. (2018), Manzoni et al. (2021), and Seemiller, Grace, Campagnolo, Alves, and De Borba (2019). Table 1 summarizes study characteristics and learning style results. All studies reported the ratio/distribution of the four learning styles, though learning style names varied based on research features and aims. For example, the Diverging learning style, which is the original name applied in Kolb’s learning theory, was changed to Reflector (Galingan, 2019), Innovator (Jurenka et al., 2018), and Imagination (Seemiller et al., 2019). Also, Kolb’s learning theory is aligned with Kolb’s Learning Style Inventory (KLSI), with a forced-choice form to match dialectical learning dimensions; however, two studies modified the response from forced-choice to a Likert-type scale (Manzoni et al., 2021; Seemiller et al., 2019), which presents limitations in comparing studies. As the study of Manzoni et al. (2021) also documented, their study participants also included Millennials, so that the study’s learning style results may have reflected both Generation Z and Millennials. Finally, it should be noted that the percentage expression described in the study of Seemiller et al. (2019) was different from those of the other studies. Their study applied a 5-point Likert scale instead of the forced-choice form and reported “the frequency of responses for those who indicated ‘often’ or ‘always’ using each style” (Seemiller et al., 2019, p. 361).

Based on the differences in these studies, it seemed difficult to compare the learning style result of one study with that of the others. Yet, some insight can be gained by listing the first and second dominant styles of learning for each study. The study of Joonas et al. (2021) showed the first learning style was Converging and the second learning styles were Assimilating and Accommodating equally; that of Manzoni et al. (2021), Assimilating (first) and Diverging and Accommodating (second) equally; that of Galingan (2019), Reflector (=Diverging, first) and Pragmatist (=Converging, second); that of Jurenka et al. (2018), Practice (=Converging, first), and Dynamic (=Accommodating, second); and that of Seemiller et al. (2019), Logic in USA and Brazil (=Assimilating, first), and Experience in USA (=Accommodating, second) and Experience and Practicality in Brazil (=Converging, equally as the second). Accordingly, it did not appear that a common learning style dominated in Generation Z.

Table 1. Summary of five studies’ results of learning style and Generation Z.

Authors	N	Country	Institution	Learning Style**							
				Diverging		Assimilating		Converging		Accommodating	
Joonas et al. (2021)	120	Mexico	University	18	15%	29	24%	44	37%	29	24%
Manzoni et al.* (2021)	592	Italy	University	150	25%	164	28%	128	22%	150	25%
				Reflector		Theorist		Pragmatist		Activist	
Galingan (2019)	149	Philippines	University	63	42%	11	7%	40	27%	35	23%
				Innovator		Analysisist		Practice		Dynamic	
Jurenka et al. (2018)	40	Slovakia	Secondary	2	5%	7	18%	22	55%	8	20%
				Imagination		Logic		Practicality		Experience	
Seemiller et al.*** (2019)	701	USA	College	390	56%	587	84%	524	75%	563	80%
	1481	Brazil	College	840	57%	1118	76%	884	60%	886	60%

Note: *Sample size and frequency numbers were estimated by the authors based on precepts presented in the study of Manzoni et al. (2021). **Names of the learning styles reflect what was used in each study, but the heading at the top indicates the original term used by Kolb. ***Frequency numbers and percentages were resulted from the first and second highest selection based on the usage of Likert scale.

4. Methods

This study involved 423 undergraduate students majoring in elementary education at an Indonesian university. As part of our research project, online survey questionnaires were distributed and collected in the spring term of 2023 at the Faculty of Teacher Training and Education. Participants’ ages

ranged from 18 to 23 years old; thus, all were considered Generation Z students. Seventy-five percent of the participants were 19, 20, or 21 years old. There were 61 male students (14%) and 362 female students (86%). This study was approved by the university, and the consent of study participants was obtained.

To identify students' learning style, we used version 3 of Kolb's (1999) KLSI translated into the Indonesian language. The psychometrics of the KLSI were investigated by several researchers (Andreou, Papastavrou, Lemonidou, Mattheou, & Merkouris, 2015; Kayes, 2005), showing that it had better psychometric properties than the previous version. The KLSI has been applied in a great number of countries (Kolb & Kolb, 2017).

5. Results

As depicted in Table 2, results of correlation analysis illustrated statistical relationships among eight key learning style variables and three demographic variables: age, gender, and academic year. Student ages were significantly correlated with the mode of abstract conceptualization (AC), had a marginally negative relationship with the mode of reflective observation (RO), and had a marginally positive relationship with a relative preference for AC over CE (i.e., AC – CE). In terms of student gender (code: 1 = male and 2 = female), there was a marginal positive relationship between gender and AC as well as AC – CE. Those results concerning demographics in relation to learning style variables might be important when considering the influence of age and gender on learning styles of Generation Z students.

Table 2. Results of correlation analysis of key learning style variables and demographic variables.

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1 Age	20.29	1.24										
2 Gender	-	-	0.05									
3 Academic year	2.83	1.88	0.46 **	0.02								
4 CE	30.59	3.77	-0.01	-0.07	0.00							
5 AC	30.79	4.08	0.12 *	0.08 †	0.06	-0.37 **						
6 RO	30.98	4.29	-0.09 †	-0.06	-0.05	-0.27 **	-0.46 **					
7 AE	27.65	3.61	-0.01	0.05	0.00	-0.3 **	-0.2 **	-0.39 **				
8 AC-CE	0.20	6.50	0.08 †	0.09 †	0.04	-0.81 **	0.84 **	-0.13 *	0.04			
9 AE-RO	-3.33	6.59	0.05	0.07	0.03	0.02	0.18 **	-0.86 **	0.08 **	0.11 *		
10 AC-CE	5.88	4.70	-0.03	-0.07	-0.08	0.57 **	-0.6 **	0.08	-0.01	-0.71 **	-0.06	
11 AE-RO	9.84	5.80	-0.03	-0.05	-0.01	-0.05	-0.15 **	0.81 **	-0.74 **	-0.07	-0.93 **	0.03

Note: ** $p < 0.01$, * $p < 0.05$, † $p < 0.10$; Gender code, male = 1, and female = 2; CE = concrete experience; AC = abstract conceptualization; RO = reflective observation; AE = active experimentation; AC – CE = relative preference for AC vs. CE; AE – RO = relative preference of AE vs. RO; |AC – CE| = balanced score between AC and CE, absolute value of [AC – (4 + CE)]; |AE – RO| = balanced score between AE and RO, absolute value of [AE – (6 + RO)].

Mean scores of four learning modes (CE, AC, RO, and AE) in Table 2 show the degree of learning mode preference: Indonesian undergraduates as a whole preferred to use the three modes of AC, CE, and RO to a similar degree, while they had a lower preference for applying the mode of AE.

Mean scores of AC – CE and AE – RO indicated a relative preference for one learning mode over the other in the same dialectical learning dimension (AC vs. CE, and AE vs. RO). Since the normative scores are AC – CE = 4.3 and AE – RO = 5.9, Generation Z Indonesian undergraduate students as a group exhibited much lower scores in the dialectical learning dimension (mean of AC – CE = 0.20 and mean of AE – RO = -3.33). Thus, Indonesian students as a group prefer to use CE more than AC in comparison with the norm, while they prefer to apply RO more than AE. These scores showed that their learning style as a group was the Diverging learning style.

Mean scores of |AC – CE| and |AE – RO| described a balanced tendency of the Indonesian students within the same dialectical learning dimension. As shown in Table 2, the score of |AC – CE| was 5.88, while that of |AE – RO| was 9.84, indicating that the Indonesian students as a group were more balanced in the learning dimension of AC – CE than that of AE – RO. This explanation is also consistent with Figure 2, which showed that the degree of the CE mode was similar to that of the AC mode, whereas the degree of the RO mode was much greater than that of the AE mode. Accordingly, it seems that Indonesian students tend to be more flexible to adapt to both AC and CE learning situations; however, they may not be so flexible with the learning dimension of AE and RO.

Based on a cut-off point using the normative scores (AC – CE = 4.3 and AE – RO = 5.9), four learning styles can be specified: Diverging, Assimilating, Converging, and Accommodating (Kolb, 1999). Table 3 presents the frequency distribution of the four learning styles. The highest number of students had a learning style of Diverging, 266 (63%); followed by Assimilating, 118 (28%); Converging, 22 (5%);

and finally Accommodating, 17 (4%). These learning style results show a learning mode of reflective observation (RO), which consists of both Diverging and Assimilating learning styles.

Table 3. Frequency distribution of four learning styles based on Indonesian undergraduates.

Learning style	Frequency distribution		learning modes combination
	number	percent	
Diverging	266	63%	CE and RO
Assimilating	118	28%	AC and RO
Converging	22	5%	AC and AE
Accommodating	17	4%	CE and AE

Additionally, to clarify relationships between the four learning styles and the two demographic variables of gender and age, we conducted chi-square tests of the relationships. As illustrated in Table 4, the group of four learning styles was marginally associated with age ($\chi^2 = 24.47, p < 0.10$) and was not related to gender ($\chi^2 = 3.43, p > 0.10$).

Table 4. Results of chi-square tests for relationships between learning style and age/gender.

		Learning Style					χ^2
		Diverging	Assimilating	Converging	Accommodating	Total	
Age	18	15	9	1	0	25	24.47 [†]
	19	65	26	3	8	102	
	20	78	32	1	3	114	
	21	61	30	6	4	101	
	22	40	18	9	2	69	
	23	7	3	2	0	12	
Gender	male	44	14	1	2	61	3.43
	female	222	104	21	15	362	
Total		266	118	22	17	423	

Note: [†] $p < 0.10$.

6. Discussion

This study explored in what way Generation Z students prefer to learn by applying Kolb's learning theory in an Indonesian university. Our study results revealed that their learning style as a group represented a Diverging learning style that accentuates the two learning modes of concrete experience (CE) and reflective observation (RO). Congruently, the largest frequency distribution among four learning styles was also the Diverging style followed by the Assimilating style. The common learning mode of these two learning styles is reflective observation (RO), which suggests the weak usage of the mode of active experimentation (AE) in a learning situation. This finding can reflect a lower degree of the AE mode. Finally, our Indonesian Generation Z participants exhibited a more balanced learning tendency in a learning situation requiring the AC and CE modes than in that demanding the AE and RO modes. This balanced tendency suggests that they become more flexible when learning in a context that requires either AC or CE modes. For example, when people participate in a field work project, they may have to capture hands-on experiences from an immediate situation, whereas they may be required to express thoughts in the form of speaking or writing. Although the situation is complex, those who possess a balanced style of learning with AC and CE modes would be able to respond to it properly.

When comparing our results with the past five Generation Z studies using Kolb's learning model discussed in the earlier section, we found few similarities. The study of Galingan (2019) using the sample of engineering university students reported that the learning style of Reflector (Diverging) was most dominant, but that of Pragmatist (Converging) and that of Activist (Accommodating) were the second and third largest group, which was different from our results. In conjunction with past studies, our results imply that an influence of factors relevant to generations on learning style might not be enough to determine a certain learning style as unique to Generation Z. To further develop the literature of Generation Z's learning style, it may be important to consider other influential factors such as educational disciplines of participants or their majors, which affect the formation of learning style (Kolb, 1984), as

well as cultural differences. This perspective may allow us to develop a research design for study of learning styles and Generation Z, including such factors as educational majors and/or country cultures.

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