

Malaysian Trainee Teachers' Readiness towards Virtual Learning: A Q Methodology

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<https://doi.org/10.24191/ajue.v20i1.25741>

Received: 12 July 2023

Accepted: 22 December 2023

Date Published Online: 14 February 2024

Published: 14 February 2024

Abstract: The COVID-19 pandemic has brought a major impact to over 1.2 billion children across 186 nations due to the school closures to manage the spread of the disease. Yet, despite this, classroom teaching and learning had to continue to keep the education system afloat, resulting in the shift to online or virtual learning that had also impacted the worldwide education market. Virtual learning has become linked to formal education, as well as the interactions among teachers, students, and educational institutions. However, virtual learning faces challenges such as limited internet access, students' readiness, and unproven effectiveness. Hence, this study utilised the Q-Methodology to investigate the knowledge level of Malaysia higher education trainee teachers on virtual learning, the attitude of trainee teachers towards virtual learning, and their readiness towards virtual learning after the shift to the endemic stage. The respondents were 54 trainee teachers from the Malaysian Higher Education Teacher Institution. The results showed that most trainee teachers had a good understanding of virtual learning, were prepared to apply the new standard medium of digital technology, and had an optimistic attitude. However, a small group was still not ready for the new normal. Hence, the findings suggest that lecturers faced a significant challenge and needed to exert more effort to design lessons that can attract trainee teachers to prepare for virtual learning.

Keywords: Digital technology, Online learning, Q-Methodology, Trainee teacher, Virtual learning

1. Introduction

Global school closures that were caused by the sudden Covid-19 pandemic has affected 1.2 billion children in 186 countries (Cathy & Farah, 2020). This necessitated sudden shifts in the teaching and learning style of education institutions to keep the education system afloat through the adoption of online or virtual learning, which has impacted the worldwide education industry (Mohd Izani et al., 2022; Celine Looi & Wong, 2022; Muaza Shifa et al., 2022). Moreover, the advent of the fourth industrial revolution (Industry 4.0) signifies the move towards intelligent industry and manufacturing objectives. The wave of industrial transformation is currently sweeping through ASEAN countries, driven by nine interconnected elements of Industry 4.0, including automation, cloud computing, data exchange, big data, cyber-physical systems, robots, artificial intelligence (AI), the internet of things (IoT), and semi-autonomous industrial techniques (Mustafa, 2018). Within this context, virtual learning

has emerged as an indispensable element of the education system. For instance, virtual environments offer significant educational benefits in terms of transmitting information and facilitating interactive participation by using video conferences or forums and chats.

Virtual learning is associated with formal education and relationships between teachers, students, and schools. However, virtual learning faces challenges caused by different performances in internet access, struggles in the adoption of technology, students' readiness in virtual learning, and the unproven effectiveness of virtual learning (Li & Lalani, 2020; Lubna & Mohd Faiz, 2022). For example, the World Economic Forum on 29 April 2020 revealed data from Organisation for Economic Co-operation and Development (OECD) that only 34% of students in Indonesia had computers compared to 95% in western countries. In comparison, the Ministry of Economic, Department of Statistics Malaysia on 12 April 2021 revealed that Malaysia had 72.1% student users in 2019.

The concept of virtual learning is highly dynamic, owing to the ever-evolving nature of digital technology, its features, potential, and vital role in the learning process. In fact, a growing number of universities and schools have adopted web-based education systems. Most educational institutions are not only integrating web technology into their courses but are also using them to complement traditional face-to-face classes. This approach enables the system to gather valuable data to evaluate course content and student usage (Valsamidisa et al., 2014). Virtual learning functions is similar to distance learning in terms of technology usage, where interactions take place through digital format such as video recording via platforms such as YouTube, Google Classroom, Google Meet, Teams. Teachers can act directly or indirectly, and the role of teachers can be replaced by digital technology and computer programmes (Kerimbayev & Kazakhstan, 2016).

In some studies, virtual learning has been proven to be more effective than conventional practices (Alves et al., 2017; Norliza et al., 2022). Some studies have shown that, on average, students can save 40% to 60% of learning time while studying online compared to in the classroom (Cathy & Farah, 2020). This is because while teaching, teachers and students can find or show information online more quickly and carefully. In other words, e-learning is faster and more functional than traditional classrooms, and learning can be recorded for students to revisit if there exists any misunderstanding during e-learning.

However, the effectiveness of online learning is not the same across all age groups. Children tend to have a shorter attention span than adolescents, and the environment can also have a significant impact on their learning. In fact, some research has shown that students do not want to continue online learning (Chung et al., 2020). Hence, to maximise the benefits of online learning, a joint effort is necessary to establish an appropriate structure that transcends the mere replication of physical classes/lectures through video capabilities. Instead, a diverse array of collaboration tools and engagement techniques should be utilised to foster “participation, personalization, and intelligence,” (Cathy & Farah, 2020).

Therefore, as professionals in the field, we believe it is crucial to explore the perceptions of higher education trainee teachers regarding their knowledge and comprehension of virtual learning, as well as their attitudes and preparedness towards this approach. This is necessary to gain a better understanding of the challenges and opportunities that arise in the post pandemic learning environment. Hence, the aim of this study was to reveal the level of knowledge, attitude, and readiness of higher education trainee teachers towards virtual learning by using the Q Methodology. The research questions were: (1) What is the perception of higher education trainee teachers' perception of virtual learning according to knowledge, attitude, and readiness, and (2) Is there a correlation between the identified factors?

3. Method

Since this study aimed to focus on obtaining rich data to answer the research questions instead of making generalisations, the Q methodology was adopted where the study utilised a qualitative and quantitative research methods. This methodology provides a foundation for the systematic study of subjectivity (Exel & Graaf, 2005). It serves as a valuable research approach to explore perceptions, both at individual and group levels. In the case of intrasubjective studies within Q methodology, data was collected from individuals based on multiple topics of interest. These individuals' opinions were then grouped together based on similarities in their perspectives. The objective was to uncover a

comprehensive understanding of the underlying themes pertaining to the issues at hand through the diverse range of opinions expressed by the individuals. Typically, participants are asked to share their viewpoints on various constructs, allowing for an evaluation of individuality and how these constructs influence their perceptions. By analysing the collective results, patterns of similarity can be identified, which then shed light on the research findings as a whole (Brown, 2004; McKeown & Thomas, 2013).

The study used Q methodology as the foundation to systematically study subjectivity of respondents' viewpoint, opinion, belief and attitude (Exel & Graaf, 2005). In a Q methodological investigation, individuals are typically provided with a set of statements related to a particular subject, referred to as the Q sample or Q set. These respondents, known as the P set, are then requested to arrange the statements in order of preference, judgement, or sentiment from their own unique perspective. This ranking is often done by utilising a quasi-normal distribution. Through Q sorting, participants give their subjective meaning to the statements, which reveals their personal profile, subjective viewpoint, or distinctive profile. Hence the application of Q methodology was employed to investigate the level of knowledge, attitude, and readiness of trainee teachers towards virtual learning. The researchers completed five steps of the study: building the concourse, developing the Q sample or Q set, selecting the P set, conducting Q sorting, and performing analysis and interpretation.

3.1 Sample study

The population of this study consisted of 54 trainee teachers who had undergone online learning during Malaysian government's Movement Control Order (MCO) from 2020 to 2022, i.e. intake June 2018 and June 2019 at one of the Malaysia Higher Education Teacher Institution campuses. All the trainee teachers took Mathematics specialisation as their major. These trainee teachers were selected because they met the criteria in this study: (1) they had experienced virtual learning during MCO; and (2) they had conducted online practicum training. More specifically, the group from the June 2018 intake had conducted practicum training twice compared to the June 2019 intake. Both had experienced online learning and physical teaching environment.

Stephenson's Q methodology is different from traditional factor analysis in that it correlates people rather than tests. Instead of administering a small number of tests to a large group of people, Q methodology provides a large number of test items to a small group of people. By correlating personal profiles, Q methodology can identify similar viewpoints of subjectivity. Through this process, Q factor analysis can provide information about the similarities and differences on a particular subject. Individuals have their own agreements and disagreements. If there are substantial groupings of correlations present, they may be condensed into factors, characterised as shared perspectives, and the individuals can be assessed in relation to them.

3.2 Data collection procedures

As mentioned earlier, Q methodology is a useful tool for understanding subjective viewpoints and personal profiles. By correlating people rather than tests, it can provide valuable insights into similarities and differences in their views on a particular subject. To conduct the Q methodology study, the researchers followed five main steps. Firstly, they compiled a diverse range of statements or items that represented different viewpoints on the topic of interest. Next, a smaller subset of these statements was selected to create the Q set. Participants who were relevant or knowledgeable in the topic area were then recruited and asked to sort the Q set items into a grid that reflected their subjective perspectives. The resulting data was analysed using factor analysis to identify clusters of viewpoints, which were then interpreted in terms of the shared perspectives.

3.3 Validation of Q samples or Q set

Q methodology is unique in that it relies on participants to interpret the statements. As a result, the method applied reduced the influence of the researchers and minimised issues related to validity. For this study, 30 statements that comprised the Q sample were carefully validated for content and grammar by an expert. Table 1 provides examples of positive and negative comments related to virtual learning that were included in the Q sample. By utilising Q methodology in this study, the researchers

were able to gather valuable insights into the subjective viewpoints of the trainee teachers towards virtual learning, without imposing their own biases and perspectives.

Table 1. Q samples

Category	Statements	No
Knowledge	I know what virtual learning is	+1
	I used a virtual learning approach at the institution.	+4
Understanding of Virtual Learning	Virtual learning can help me understand teaching and learning more efficiently.	+7
	Virtual learning is more flexible.	+10
	Virtual learning creates collaborative learning.	+13
Attitude toward Virtual Learning	I dislike learning using a virtual learning environment.	-2
	I dislike using a virtual learning environment to find material.	-5
	It is not my responsibility to operate a virtual learning environment.	-8
	I can do anything during virtual learning because the lecturer does not see me.	-19
Readiness towards Virtual Learning	I am willing to use virtual learning approaches in teaching and learning.	+3
	Virtual learning makes it easier for me to interact with lecturers	+9
	Performance makes coursework easier by using virtual learning.	+26
	Virtual learning is easier and simpler.	+30

+ : Positive Statement - : Negative Statement

3.4 Data preparation and analysis

The collected data was analysed using the PQ Method software version 2.33, which allowed for the calculation of correlation matrices of the Q sorts. Q methodology was used to identify similarities, differences, correlations, and factors related to the trainee teachers' subjective viewpoints towards virtual learning. Through correlation analysis, each participant's subjective arrangement of the 30 statements in the Q sort was statistically correlated to a 54 X 54 matrix, revealing their understanding of the geometry of their personal profile. The software was used to calculate these correlation matrices of the Q sorts, as described by Schmolck (2012). Overall, the use of Q methodology and PQ Method 2.33 allowed for a comprehensive analysis of the subjective viewpoints of trainee teachers towards virtual learning, providing valuable insights into their level of knowledge, attitudes, and readiness towards this topic.

4. Findings and Discussion

The findings and discussion for the analysis of this study aimed to answer the two research questions: (1) What is the perception of higher education trainee teachers' perception of virtual learning according to knowledge, attitude, and readiness, and (2) Is there a correlation between the identified factors?

4.1 Respondents' demography

This study was conducted by using a Q set through Google Form to collect data after Q sorting. The instrument link was distributed to the respondents within two weeks. Then, the respondents' profiles were analysed using descriptive analysis which included frequencies and percentages based on the criteria stated in the selection sample study. The research findings showed that 54 trainee teachers were involved as respondents, which reached the expected number for Q methodological studies that often rely on a relatively small number of participants. The primary objective was to uncover and comprehend the pivotal viewpoints held by this specific group of participants with the aim of achieving a profound qualitative understanding, rather than quantifying the prevalence of a particular viewpoint across a larger population. A total of 54 trainee teachers were involved as shown in Table 2.

Table 2. Distribution of Respondents According to Intake and Gender

Intake	Gender	Frequency	Percentage (%)
2019	Male	7	12.96
	Female	14	25.93
2020	Male	9	16.67
	Female	24	44.44
Total		54	100

4.2 Data Analysis

The result of the correlation matrix score showed the +1 to -1 range, where +1 indicates a perfect positive relationship, -1 indicates a perfect negative relationship that is completely opposite to +1, and 0 indicates no relationship at all between the sorts. The significance level of the correlation value was identified using the formula of standard error (SE) (Schmolck, 2012). In this study, 30 statements were included in the Q sort, and the standard error was calculated as $1/\sqrt{30} = 0.1826$. To achieve a 95% ($p < .05$) correlation coefficient utilisation, the result was $1.96(SE) = 1.96(0.1826) = 0.3579$ (Brown, 1993). According to the findings from PQ Method version 2.33, 1,724 out of 2,916 correlation matrices between sorts were significantly correlated, which accounted for 59.12%. In summary, the results indicated a significant relationship between the sorts, demonstrating the effectiveness of Q methodology in identifying subjective viewpoints towards virtual learning among trainee teachers.

Table 3 displays a sample of summarised statements for each factor produced by utilising the PQ method. The statements that highlight the participants' perspectives were arranged in ascending order from +4 to -4. Three of the factors were titled as follows:

Table 3. Statement Scores by Factors/Opinion Types

No.	Statement	Factors		
		1	2	3
1	I know what the virtual learning	4	2	3
2	I dislike learning using a virtual learning environment.	-1	-2	3
3	I am willing to use virtual learning approaches in teaching and learning.	2	2	-3
4	I used a virtual learning approach at the institution.	3	1	4
5	I dislike using a virtual learning environment to find material.	-4	-2	1
6	I have access to the internet.	3	1	1

4.3 Factor 1: Positive Thinking with Consensus towards Virtual Learning

43 out of 54 participants, or 79.6% of the higher education trainee teachers, had positive thinking towards virtual learning with the knowledge of online systems and applications, a good attitude in facing the new normal, and readiness to use online applications. Most importantly, they felt that the technology was fun to use and flexible and did not cause any stress or problems in communicating with another person. They were very much aware that using technology requires an understanding of knowledge, including online systems, the Internet, and the application before it can be utilised efficient learning (Table 4). These findings are parallel to several studies which highlighted relatively positive indicators regarding students' access to a virtual learning environment and the relation between such access and their performance (Alves et al., 2017; Chen et al., 2021; Tsai et al., 2021).

Table 4. Factor 1 Matrix of Positive Thinking

Category	Statements	Rank
Knowledge Understanding of Virtual Learning	I know what virtual learning is	4
	I used a virtual learning approach at the institution.	3
	I know how to submit assignments using google classroom, google meet, zoom, skype, and Microsoft team applications.	2
Attitude toward Virtual Learning	Virtual learning can improve my skills in using ICT.	2
	I dislike using a virtual learning environment to find material.	-4
	It is not my responsibility to operate a virtual learning environment.	-3
Readiness towards Virtual Learning	I can do anything during virtual learning because the lecturer does not see me.	-3
	I am willing to use virtual learning approaches in teaching and learning.	2
	I have access to the internet.	3
	I can learn by using a virtual learning approach outside of lecture hours.	2

In Factor 1, the participants were recognised for understanding what virtual learning is, using virtual learning as an alternative way of learning, and being familiar with online applications such as Google Classroom, Google Meet, Zoom, Skype, and Microsoft Teams. The majority of trainees demonstrated an excellent attitude and took complete responsibility for managing the virtual learning environment. They also respected the schedule of the lesson, total attendance, and attention during lectures. Higher education trainee teachers were prepared with Internet at home for online classes and were willing to do extra courses outside lecture hours.

4.4 Factor 2: Positive Thinking with Consensus towards Virtual Learning but Less Skill in Technology

Factor 2 was found to be engaging for approximately 11.1% of the students (Table 5), which means 6 out of the 54 participants intended to use an online system for virtual learning but lacked knowledge of technology applications. Furthermore, this group was likely to have a good attitude towards virtual learning but felt less enrichment for online applications and potential interference with work.

This group showed that they understood the importance of virtual learning and had a positive attitude and a strong sense of responsibility to utilise it; however, they were not good at using Google Classroom, Google Meet, Zoom, Skype, and Microsoft Team applications. They also had zero readiness with learning via a virtual learning environment. The findings closely aligned with Omar et al.'s (2020) study, which revealed that research university students in Malaysia had a favourable perception of online instruction compared to their non-research university counterparts, which were attributed to superior facilities and resources. Nevertheless, a significant portion of students expressed a need for additional guidance and support in areas such as consistent feedback, performance evaluation, and engagement.

Table 5. Factor 2 Matrix of Positive Thinking, Less Skill of Technology

Category	Statements	Rank
Knowledge Understanding of Virtual Learning	I know what virtual learning is	2
	Virtual learning is more flexible.	3
	I know how to use google classroom applications, google meet, zoom, skype, and Microsoft Teams.	-1
	I am good at using google classroom, google meet, zoom, skype, and Microsoft team applications.	-1
Attitude toward Virtual Learning	I have less fun applying google classroom, google meet, zoom, skype, and Microsoft team applications because it is not easily accessible anywhere.	-3
	I can do anything during virtual learning because the lecturer does not see me.	-3
	I do not like to connect with friends using google classroom, google meet, zoom, skype, and Microsoft applications.	-4
	I do not feel left out in lessons, even learning to use a virtual learning environment.	0
Readiness towards Virtual Learning	I am always looking forward to learning using a virtual learning environment.	0
	I enjoy talking to friends while doing coursework with virtual learning.	0

4.5 Factor 3: Negative Thinking with Disagreement towards Virtual Learning

5 out of 54 participants, or 9.3% of the students, thought negatively about virtual learning. They understood the need for virtual learning, but they disagreed with the implementation of online classes, which is similar to the result of the study by Chung et al. (2020). They had a negative attitude towards virtual learning and were not ready to join the online course. Further investigation showed that they felt bored using technology and did not enjoy communicating with each other. This was similar to the study of Janelyn and Candy (2023), whose findings showed that virtual learning was hard due to limited or poor Internet connectivity, and a lack of tools like laptops.

Table 6. Factor 3 Matrix of Negative Thinking

Category	Statements	Rank
Knowledge Understanding of Virtual Learning	I know what the virtual learning	3
	I used a virtual learning approach at the institution.	4
	Virtual learning can help me understand teaching and learning more efficiently.	-2
	Virtual learning is more flexible.	-2
	Virtual learning can improve my skills in using ICT.	-2
Attitude toward Virtual Learning	I dislike learning using a virtual learning environment.	3
	I have less fun applying google classroom, google meet, zoom, skype, and Microsoft team applications because it is not easily accessible anywhere.	2
	I do not like to connect with friends using google classroom, google meet, zoom, skype, and Microsoft applications.	2
Readiness towards Virtual Learning	I am willing to use virtual learning approaches in teaching and learning.	-3
	I am always looking forward to learning using a virtual learning environment.	-1
	Virtual learning is easier and simpler.	-2

This group showed disagreement with online or virtual learning. They understood the knowledge of online systems but disagreed that virtual learning can help them understand the lesson more easily. Based on the results shown in Table 6, they differed with the opinion that virtual learning is more flexible. Generally, they disliked learning via virtual learning environment and were not willing to use virtual learning approaches in teaching and learning. By selecting these statements and giving them higher ranking, it appeared that these students may not be receptive to virtual learning and instead preferred traditional face-to-face learning environments.

4.6 Correlation between factors and reliability

In Table 7, correlation between the primary factor scores and the notable disparities among the factors can be established with a significant correlation of > 0.5 , according to Exel and Graaf (2005). This study found a correlation score of 0.4795 between Factor 1 and Factor 2, indicating a weak correlation. Similarly, a weak correlation was observed between Factor 1 and Factor 3, with a correlation score of 0.3286. In contrast, a negative correlation was observed between Factor 2 and Factor 3, with a correlation score of -0.0002. All the correlation findings were below 0.5, which is consistent with the standard reference and suggests that they do not interfere with each other. The result of the study aligned to Tan et al. (2021), which showed a positive effect of virtual learning but there were others that needed to be considered for the successful implementation of virtual learning. The findings indicated that students generally held positive perceptions regarding motivation and satisfaction, while a lack of interaction was predominantly viewed as an unfavourable aspect of online instruction. Three key factors were identified as influential: the quality of instruction, online interaction, and the availability of instructional and technical support.

Table 7. Correlations Between Scores of Factors

	1	2	3
1	1.0000	0.4795	0.3286
2	0.4795	1.0000	-0.0002
3	0.3286	-0.0002	1.0000

The reliability of both individual factors and factors as a whole were determined by examining the distinctive statements associated with each factor. According to Brown (1993), the reliability of subjective responses can reach or exceed 0.80. Table 8 shows that the composite reliability for Factor 1, Factor 2, and Factor 3 in the present study falls within the range of 0.889 to 0.994. The standard error associated with each factor score provides insight into the reliability of the identified Q sorts.

Table 8. Factor Characteristics

	Factor		
	1	2	3
Number of Defining Variables	43	6	5
Average Relative Coefficient	0.800	0.800	0.800
Composite Reliability	0.994	0.942	0.889
S.E. of factor Z-scores	0.076	0.243	0.333

5. Conclusion

Q methodology differs from traditional factor analysis in that it correlates with individuals rather than items. This study discovered three factors to be considered as virtual learning group characteristics. The factors are (1) Positive thinking with consensus towards virtual learning; (2) Positive thinking with consensus towards virtual learning but less skill in technology, and (3) Negative thinking with disagreement towards virtual learning. However, the findings showed a weak correlation between the factors and a negative correlation between Factor 2 and Factor 3. There was no relation between the groups as each group represented a different indicator.

The indicator mentioned refers to the group's level of understanding regarding knowledge, readiness, and attitude. Trainee teachers in the first group formed the majority as the statistic showed that 80% of the respondents were in this factor. Meanwhile, the second group consisted of 11% of respondents, and the third group, 9% only. Nevertheless, these findings showed that a large number accepted virtual learning in the new normal. Hence, we can conclude that most trainee teachers understood virtual learning well, are fit for applying virtual learning as their learning medium and are optimistic about virtual learning. Meanwhile, the minority groups for factors 2 and 3 need special attention to change their perception of virtual learning in the future.

Contemporary education has assumed a significant role in establishing a high-calibre virtual learning environment, particularly to enhance students' receptiveness and preparedness for learning. Addressing the second research question reveals various prevailing circumstances that can hinder the attainment of quality online teaching in higher education. Educators face the challenges of enhancing their competence, skills, and knowledge to ensure clear instructional delivery and promote increased interaction with students. Additionally, inadequate technological proficiency among educators poses a barrier to effective online instruction and student engagement. In order to achieve superior education, successful implementation of virtual learning must align with the principles of quality online teaching and foster students' collaborative, creative, critical thinking, and communication skills that are essential in the 21st century (Norliza et al., 2020; Tan et al., 2022; Nor Azairiah et al., 2023). Consequently, educators are urged to embrace innovative instructional techniques in order to achieve fruitful learning outcomes although there may be hurdles encountered in teaching delivery.

6. Limitations and suggestions for future studies

The findings are specific to a single higher education teacher training institution in Malaysia and should not be extrapolated to other contexts. However, the reliability is vital, as it was over 0.80, which makes the findings locally reliable. Therefore, further studies are suggested to include factors that influence positive perceptions among trainee teachers on virtual learning in the local context in aspects such as quality instruction, online interaction, and instructional and technical support. It is essential for future research to recognise the significance of instructors' roles in addressing the issues identified in this scoping review. To ensure the successful implementation of online instruction, a thorough examination of an online instructional framework and instructional design is necessary to enhance the pedagogical value within the field of education.

7. Co-Author Contribution

The authors explicitly stated that there is no conflict of interest in this article. Author 1 was responsible for conducting the field work, developing the research methodology, and overseeing the writing of the entire article. Author 2 contributed by writing the literature review and conducting the data entry. Both authors conducted the statistical analysis and interpreted the results.

8. Acknowledgements

The researcher would like to thank the Institute of Teacher Education Malaysia and trainee teachers who agreed to participate in this study.

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10. Appendix

Factor Scores with Corresponding Ranks

No.	Statement	No.	Factors					
			1	2	3			
1	I know what is VL.	1	1.75	1	0.87	7	1.55	3
2	I dislike learning using a VL environment.	2	-0.29	19	-1.04	25	1.55	3
3	I am willing to use VL approaches in T&L.	3	0.97	6	1.00	5	-1.55	29
4	I used a VL approach during the MCO period.	4	1.74	2	0.72	8	2.07	1
5	I dislike using a VL environment to find material.	5	-1.82	30	-0.97	24	0.52	12
6	I have access to the internet.	6	1.33	3	0.39	11	0.52	12
7	VL can help me understand T&L more easily.	7	-0.59	23	0.33	13	-1.04	27
8	It is not my responsibility to operate a VL environmen	8	-1.81	29	-1.14	27	-2.07	30
9	VL makes it easier for me to interact with lecturers.	9	-0.46	21	1.89	1	0.52	12
10	VL is more flexible.	10	0.33	13	1.63	3	-1.04	27
11	I have less fun when accessing VL environment.	11	-1.02	25	-0.87	23	-0.52	23
12	I can learn by using a VL approach outside of lecture	12	1.17	5	1.16	4	0.52	12
13	VL creates collaborative learning.	13	-0.12	14	0.93	6	1.04	7
14	I have less fun when applying GC, GM, because not easy	14	-1.21	27	-1.27	29	1.04	7
15	I can access the VL environment easily even outside ho	15	0.52	11	0.39	10	-0.52	23
16	I like the assessment of teaching and learning in VL.	16	-0.38	20	0.69	9	0.00	17
17	I do not feel left out in lessons even learning to use	17	-0.16	16	0.31	14	0.00	17
18	I know how to use GC, GM application.	18	0.86	8	-0.57	20	0.00	17
19	I can do anything during VL because the lecturer not s	19	-1.59	28	-1.26	28	-1.55	29
20	I am always looking forward to learning using VL.	20	-0.15	15	-0.21	17	-0.52	23
21	I know how to submit assignments using online applicat	21	0.96	7	-0.69	22	0.00	17
22	I do not like the attractive GC, GM and zoom displays.	22	-1.13	26	-1.11	26	-0.52	23
23	I enjoy talking to friends while doing course work wit	23	-0.53	22	0.15	16	-0.48	18
24	I am good at using online application.	24	0.43	12	-0.58	21	-0.52	23
25	I do not like to connect with friends online applicati	25	-0.67	24	-2.01	30	1.04	7
26	Performance makes course work easier by using VL.	26	-0.27	18	0.34	12	0.00	17
27	I am good at downloading pictures and videos in online	27	0.53	10	-0.46	18	1.04	7
28	Teaching and learning can be repeated through recordin	28	0.56	9	-0.57	19	0.52	12
29	VL can improve my skills in using ICT.	29	1.22	4	0.25	15	-1.04	27
30	VL is easier and simpler.	30	-0.17	17	1.69	2	-0.56	24