

Knowledge, Attitude, and Practice (KAP) of Online Learning Among Higher Learning Institutions' Students in Sabah

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DOI: <https://doi.org/10.47772/IJRISS.2026.1026EDU0563>

Received: 27 August 2026; Accepted: 01 September 2026; Published: 11 September 2026

ABSTRACT

Online learning is a preferred and essential tool used by many public and private institutions. In this era of digitalization, it has become evident that the use of online platforms is the new norm, and the widespread adoption of online learning urges students to know how to use digital tools, have a positive attitude towards the online learning environment, and actively engage in online discussions. This study aimed to determine the levels of knowledge, attitudes, and practices regarding online learning among diploma and bachelor's students in Sabah. This study is quantitative and uses a cross-sectional survey administered via Google Forms. The number of respondents collected was 256 from both diploma and bachelor's degree levels. Data were analyzed using the Statistical Package for the Social Sciences (SPSS). The study is expected to enhance understanding of current levels of knowledge, attitudes, and practices regarding online learning, as evidenced by the test results and discussion of the findings. This study also serves as a reference for future researchers who intend to explore KAP-related studies in online learning or extend the framework to other educational contexts.

Keywords: Knowledge, Attitude, Practice, Online Learning, Higher learning Institution Students.

INTRODUCTION

Education has changed with technological development. The term "traditional learning" refers to in-person instruction in classrooms, where students and lecturers interact directly to teach and learn. Although this approach has long been the cornerstone of formal education, the COVID-19 pandemic forced educational institutions worldwide to suspend in-person classes, which quickly led to a shift towards online learning as a substitute to maintain educational continuity (UNESCO, 2020). Online learning in Malaysia gained prominence during the COVID-19 pandemic, especially during the lockdown, when educational institutions were forced to stop holding classes physically. Rather than being fully planned, it was frequently used as emergency remote teaching (Hodges et al., 2020).

Among the changes to the education system is the concept of online learning. Online learning is an approach that uses online platforms and the internet to conduct learning activities. For example, at Universiti Teknologi MARA (UiTM), online learning is facilitated by multiple platforms, including UFUTURE, Google Classroom, Microsoft Teams, Zoom, and Google Meet. Thus, students need to be conversant with online learning tools and learn to adjust to online learning environments. For instance, according to Rosi (2021), a study on students' knowledge, attitude, and practice (KAP) regarding online learning in Indonesia revealed that students acknowledged both the benefits and challenges of online learning and identified platforms such as Google Meet and Zoom as the most effective tools for their educational activities.

This study investigates the Knowledge, Attitude, and Practice (KAP) of online learning among diploma and bachelor's students in Sabah to understand their beliefs and behaviors related to this topic. The objectives of this study are to determine the level of knowledge of students in Sabah regarding online learning tools and platforms, to identify the level of attitude and support felt by students in an online learning environment, and to examine the frequency of practice of students in online learning activities, such as attending virtual classes,

participating in discussions, and completing online assignments

LITERATURE REVIEW

This literature review examines past studies on online learning using the Knowledge, Attitude, and Practice (KAP) framework. It focuses on students' understanding, perceptions, and learning behaviors, as well as the advantages, disadvantages, opportunities, and challenges of online learning in higher education contexts. This review provides a foundation for analyzing online learning experiences among students in higher learning institutions in Sabah.

Knowledge of Online Learning

Prior research has examined students' knowledge of online learning, particularly in relation to digital literacy, acceptance of online platforms, and awareness of the requirements for online learning. According to a study by Sit, Chung, Chow, and Wong (2005) on an online learning initiative among 198 nursing degree students in Hong Kong, the students felt that online learning was convenient and that they could manage their own learning. Since students are exposed to a variety of digital tools, including learning management systems, video conferencing platforms, and online assessment systems, several researchers have found that online learning improves students' technological knowledge (Dhawan, 2020). According to earlier research by Ruiz et al. (2006), e-learning improves student engagement and content retention, which increases the efficacy of academic delivery. An important benefit of online learning in higher education is enhanced digital competence, facilitated by increased exposure.

However, research shows that students' understanding of effective online learning techniques remains limited, despite their growing familiarity with online platforms. According to Hung et al. (2010), students who participate in online courses may have varying levels of awareness, readiness, and preparedness, which may affect both their academic performance and the courses' effectiveness. Research has shown that the main knowledge-related challenges to the adoption of e-learning, especially in developing nations, are limited access to computers, poor internet connectivity, and a lack of institutional support for training (Ruiz et al., 2006). Many students had access to online learning platforms but lacked the knowledge needed to manage independent study, evaluate online materials, and uphold academic integrity in virtual settings. Students often conflate access to technology with readiness to learn, which may lead to inadequate knowledge.

In terms of opportunity, online education gives students access to a wide range of educational materials and global knowledge beyond traditional classroom settings. Research indicates that by promoting self-directed learning and ongoing skill development, online platforms help students acquire lifelong learning abilities (Dhawan, 2020). In post-pandemic higher education, where digital skills are increasingly important, this opportunity is especially useful. Although online learning can be a useful tool for improving one's knowledge, it cannot be the sole method of learning because many people cannot guarantee continuous internet access. Therefore, understanding online learning offers an opportunity to provide students with greater benefits once the challenges are resolved.

Several knowledge-related difficulties persist, particularly among students from rural or underdeveloped areas. Students' knowledge development in online learning is severely impaired by limited internet access, insufficient technology, and limited prior exposure to digital tools (UNESCO, 2020). According to Hung et al. (2010), students who participate in online courses may have varying degrees of knowledge, readiness, and preparedness, which may affect both their academic performance and the effectiveness of the online courses. These difficulties highlight the ongoing impact of the digital divide on students' educational experiences, especially in online learning.

Attitude of Online Learning

Their attitudes towards it significantly influence students' acceptance of online learning. Positive attitudes regarding online learning have been reported in several studies. Online learning should be promoted in

educational institutions, according to 81% of respondents, and used as an additional tool, according to 71% of respondents (Kumar et al., 2018). According to earlier research, intrinsic motivation and perceived convenience, such as cost savings and ease of access to information, affect students' satisfaction with online learning (Vanslambroucka et al., 2018; Bali & Liu, 2018; Herrin, 2001; Soon et al., 2000). A positive attitude towards online learning influences the use of digital tools, according to a study conducted by Saxena et al. (2022) among Indian medical students. Higher levels of motivation and satisfaction result from these positive perceptions, especially for students who place a high value on learning autonomy.

Negative perceptions of online education have also been repeatedly recorded. However, problems like screen fatigue, elevated stress levels, and a lack of emotional connection with educators continue to have an unhealthy effect on students' attitudes. According to the findings, most students had a passive attitude towards online learning, felt alienated because they couldn't access online learning platforms, and were bored, lonely, and stressed by limitations in using online platforms (Sim, Sim, & Quah, 2021). Another study by Broadbent and Poon (2015) confirms that many students in online learning lack self-discipline and motivation, which leads to disengagement and procrastination. These results imply that unfavorable attitudes, such as a lack of interest and initiative, are typical barriers to successfully conducting online activities.

From an opportunity standpoint, the COVID-19 pandemic has made students more open to blended and online learning. Many students have favorable views of technological advancements in online education, recognizing that they offer opportunities to maintain academic focus and to experiment with various methods of learning and skill assessment (Pettyjohn & LaFrance, 2022). Higher education institutions now have the opportunity to incorporate modern instructional methods and hybrid learning models.

Despite its positive aspects, students' attitudes have continued to be challenged by the difficulties associated with online learning. According to earlier research, students often show poor focus and engagement in research classes. Due to low engagement and less interaction with peers and instructors, many students show low motivation to participate in online classes. Additionally, instructors have noted that students frequently show little interest in online learning, indicating a negative attitude towards it (Cook et al., 2008). Their dissatisfaction with unstable internet connections and connectivity problems, which negatively affect their attitudes towards online learning, contributes to this lack of interest (Reeves, 2000). These difficulties show that encouraging learning environments is necessary to promote positive attitudes.

Practice of Online Learning

According to Alam et al. (2021), the effectiveness of the teaching and learning process is significantly correlated with the degree of experience with online learning and digital platform usage. Additionally, Wang et al. (2022) found that recording online lectures has grown in popularity, with 75% of students citing the ability to evaluate complex material as a key advantage. Such adaptability is seen as a significant benefit that supports a range of learning requirements.

Yet, several studies have found disadvantages associated with students' online learning habits. Reduced levels of student engagement and learning in online settings have been documented in earlier research, and some students believe that interactive technology features are not effective for successful participation (Martin & Bolliger, 2018). Key issues with online learning practices have been identified by several studies, including students' poor time management, lack of self-regulation, and difficulty using technology (Chuang et al., 2018; Rasheed et al., 2020). On the other hand, students in Sabah encountered several difficulties with e-learning, including unfavorable learning environments, a lack of educational resources, and feelings of social isolation (Jafar et al., 2022).

Through forums, group projects, and virtual collaboration tools, online learning promotes the growth of self-regulated learning and collaborative practices. Positive engagement in online courses can be fostered by the opportunities e-learning provides. Schools should adopt strategies that ensure content is engaging and well organized to improve effective online learning practices further. However, a barrier to successful online learning is a lack of opportunities for fellow students to collaborate on the subject matter (Atack & Rakin,

2002).

The difficulties persist despite these opportunities. According to Sim, Sim, and Quah (2021), the results indicated that the majority of students encountered the following primary challenges: slow instruction and learning. Prior studies have demonstrated that although students appreciate the flexibility of hybrid learning, many still struggle with real-world issues such as a lack of self-control, poor time management, and limited immediate feedback (Rosi, 2021). Furthermore, an important barrier to successful online learning is students' inability to pay for personal computers, smartphones, and other essential devices.

Research Gap

Building on previous studies on online learning and the knowledge, attitudes, and practices surrounding it, the study focuses on students' perceptions and acceptance of online learning's effectiveness during the Covid-19 pandemic. Several studies on KAP were also conducted among specific groups of students in different countries, which may have different social and geographical demographics than those in Sabah, Malaysia, prompting this study to focus on a more relevant, closer demographic. There are currently few studies that have assessed the knowledge, attitudes, and practices of online learning among students in Sabah, especially among diploma and bachelor students. Therefore, this study aims to determine the levels of knowledge, attitudes, and practices regarding online learning among students. This study conducted an inferential analysis to examine the correlation among the three constructs (knowledge, attitude, and practice) that influence students, especially in online learning.

KAP as a Social Learning Theory

The KAP model process originated from social learning theory (Bandura, 1976). Knowledge, attitudes, and practices are critical components of behavioral change models. Knowledge is the understanding of information, the conscious and non-symbolic perception of meaning, the attitude expressed towards the subject analyzed, and the practices indicating action towards the subject (Wessman, 2006). When using the KAP model, it is very important that the researcher can fully understand how to distinguish between the three constructs of knowledge, attitude, and practice and have a proper understanding of what these three constructs mean and how to correlate them, as proposed by Vargas-Garido (2026). Without a deeper understanding, it is easy to misinterpret the correlations among constructs. The KAP model is also a diffusion of innovation theory (Roger, 1995). It indicates that the KAP model can be used as a guideline and can be used to assess the current prevalence of knowledge, attitudes, and practices, while evaluating people's willingness to adopt positive changes beyond existing conditions.

CONCEPTUAL FRAMEWORK

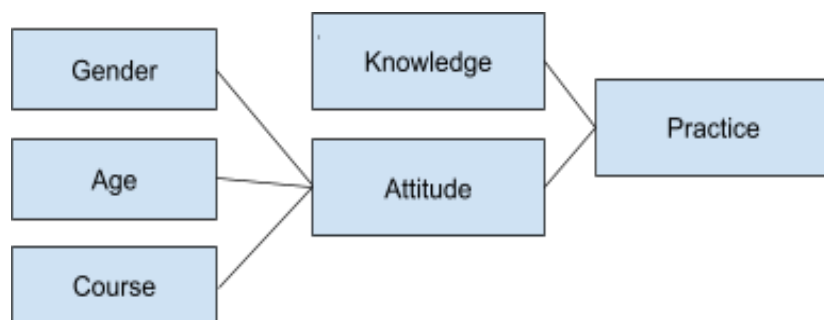
This study is guided by a conceptual framework based on the Knowledge–Attitude–Practice (KAP) model. Since several studies use the KAP social learning theory as a foundation to ‘conceptualize’ the study's structure, this study also adopts a similar customization that fits its overall purpose. According to Imelda (2024), a conceptual framework differs from a theoretical framework, which provides the study's theoretical foundation. The conceptual framework provides the overall picture and logical structure of the study. As portrayed in Figure 1, this study used the framework to determine whether students have higher levels of online learning knowledge, positive attitudes towards online learning, and frequent use of online learning. This study provides a current overview of the knowledge, attitudes, and practices of online learning among students in Sabah. It offers valuable insights for higher institutions and future researchers to extend this research concept to other contexts relevant to future needs.

The following hypotheses were tested to determine the correlation among the three KAP constructs.

H1: Knowledge has a significant relationship with practices towards online learning among students.

H2: Attitude has a significant relationship with practices towards online learning among students.

Figure 1 Conceptual Framework



The framework illustrates the variables examined in relation to students' knowledge, attitudes, and practices towards online learning. The study first tests the levels of knowledge, attitudes, and practices of online learning using descriptive and mean analyses to provide an overview of each construct.

The framework illustrates the demographic variables (gender, age, and course) to test the existence of differences and their influence on attitudes towards online learning. These variables are analyzed using one-way ANOVA (analysis of variance). It aims to determine whether there are significant differences among students by demographic group in their attitudes toward online learning.

In addition, the conceptual framework proposed that knowledge and attitude correlate with practice. The illustration is in line with the hypothesis, whereby H1, knowledge, has a significant relationship with practices towards online learning among higher learning institutions in Sabah. H2: Attitude has a significant relationship with practices towards online learning among students. Pearson correlation was used to test if H1 and H2 were supported.

METHODOLOGY

The study location is Sabah in general. The population of this study is among students who are currently doing a Diploma and degree program. This study adopted quantitative, convenience sampling and cross-sectional research design. The sample size of 256 respondents was collected. Based on the Krejcie and Morgan (1970) sample size table, it is generally sufficient to detect medium to large effects if the data meet the assumptions, considering practical constraint such as lower response rates and limited time for data collection. These research instruments used a structured questionnaire consisting of a Likert Scale to determine the level of awareness, students' attitude and the frequencies of online platform usage. Data were collected by using Google Form and distributed online to respondents. Descriptive analyses were used to test the levels of knowledge, attitudes and practices. One-way ANOVA was conducted to test whether there is a significant difference in attitude based on three demographic variables (gender, age and course), while Pearson correlation was used to analyze the relationship among knowledge, attitude and practice of online learning.

Table 1: Measurement of variables, normality test, and reliability test results

Variables	Items	Skewness	Kurtosis	Cronbach's Alpha
Knowledge	K1 - K6	-1.452	2.836	0.760
Attitude	A1 - A7	-0.972	0.611	0.888
Practice	P1 - P7	-0.986	1.085	0.818

The normality and reliability test results for all constructs are shown in Table 1. A measurement tool can be adopted if the standardized item alpha value is at least 0.70 to 0.80 (Sekaran & Bougie, 2013). Then, normality assumptions are considered normal when the value of Skewness (-3 to +3) and Kurtosis (-10 to +10) (Kline,

2005). Based on Table 1, the study fulfilled the assumptions of normality and reliability.

FINDING

Demographic Profiles

There were no missing data in this study, and a total of 256 valid respondents were obtained. In terms of gender, the majority of respondents were female (n=155, 60.5%), while male respondents were 39.5% (n=101). Regarding the age, most respondents were between 21-23 years old (n=141, 55.1%), followed by those aged 18-20 years old (n=96, 37.5%). Only 17 respondents (6.6%) were aged 24-26 years old, while 2 respondents (0.8%) were aged 27-29 years old. According to their course, most of the respondents were degree students (n=140, 54.7%) and Diploma students were 45.3% (n=116). Based on the respondents' semester of study, the largest group was Semester 6 students (n=66, 25.8%), followed by Semester 4 students (n=64, 25.0%) and Semester 5 students (n=43, 16.8%). The remaining respondents are Semester 3 (n=40, 15.6%), Semester 2 (n=29, 11.3%) and Semester 1 students (n=14, 5.5%). Lastly, the respondents main device used for online learning has seen that Smartphone and Laptop (n=179, 69.9%) are the choices for the students to use for online learning, followed by Tablet/Ipad (n=105, 40.2%) and Desktop Computer only 5.1% (n=13).

Table 2: Demographic profiles

Profile		Frequency	Percentage (%)
Gender	Male	101	39.5
	Female	155	60.5
Age	18-20 years old	96	37.5
	21-23 years old	141	55.1
	24-29 years old	19	7.4
Course	Diploma	116	45.3
	Degree	140	54.7
Semester of study	Semester 1	14	5.5
	Semester 2	29	11.3
	Semester 3	40	15.6
	Semester 4	64	25.0
	Semester 5	43	16.8
	Semester 6	66	25.8
Main device used for online learning	Smartphone	179	69.9
	Laptop	179	69.9
	Tablet/Ipad	105	40.2
	Desktop computer	13	5.1

Mean Score Analyses

Table 3: Level of Knowledge of students regarding online learning tools and platforms.

Items	Mean	SD	Min	Max	Level
K1. I am familiar with common online learning platforms used (e.g., Google Classroom, i-Learn, Microsoft Teams, UFUTURE, Online Library, and UiTM Emerald).	4.54	0.853	1	5	High
K2. I know how to access and download learning materials from online learning platforms.	4.64	0.705	1	5	High
K3. I understand how to submit assignments through online learning system	4.67	0.688	1	5	High
K4. I know how to participate in online classes using video conferencing tools (e.g., Zoom, Google Meet, Webex).	4.63	0.734	1	5	High
K5. I am not aware of the basic features of online learning tools (chat, discussion forum, file upload, attendance). (Reverse-coded)	3.9531	1.39106	1.00	5.00	High
K6. Overall, I think online learning platforms are easy to use.	4.49	0.812	1	5	High

The result of the mean and standard deviation of the respondents' level of knowledge of students in Sabah regarding online learning tools and platforms are provided in Table 3. Results showed that all the questionnaire items had high mean scores, reflecting that the respondents mostly have strong knowledge of online learning tools and platforms, especially the K3. "I understand how to submit assignments through online learning systems" (Mean=4.67, SD=0.688), K2. "I know how to access and download learning materials from online learning platforms" (Mean=4.64, SD=0.705) and K4. "I know how to participate in online classes using video conferencing tools (e.g., Zoom, Google Meet, Webex)" (Mean=4.63, SD=0.734).

Likewise, the high result of mean from the respondents also showed how they are familiar with common online learning platforms used (e.g., Google Classroom, i-Learn, Microsoft Teams, UFUTURE, University Library et al) (Mean= 4.54, SD=0.853) and K6. "Overall, I think online learning platforms are easy to use" (Mean=4.49, SD=0.812). Last, for the question K5. "I am not aware of the basic features of online learning tools (chat, discussion forum, file upload, attendance)" was the lowest in mean score but still considered at high level of knowledge.

Table 4: Level of Attitude of Students in an online learning Environment

Items	Mean	SD	Min	Max	Level
A1. I feel motivated to attend online classes.	4.12	1.174	1	5	High
A2. Online learning helps me manage my study time more effectively.	4.12	1.140	1	5	High
A3. I am interested in learning through online platforms.	4.20	1.094	1	5	High

A4. I feel comfortable interacting with lecturers during online classes.	4.06	1.185	1	5	High
A5. I don't feel confident expressing my ideas during online discussions. (Reverse-coded)	3.3398	1.50741	1.00	5.00	Medium
A6. Online learning encourages me to be more independent in my studies.	4.19	1.097	1	5	High
A7. I prefer a combination of online and face-to-face learning compared to fully face-to-face learning.	4.26	1.116	1	5	High

As shown in Table 4, the respondents of students in Sabah on the A7 "I prefer a combination of online and face-to-face learning compared to fully face-to-face learning" variable mean score showed a high mean score of (4.26, SD= 1.116), followed by A3. "I am interested in learning through online platforms" (Mean=4.20, SD=1.094 and A6. "Online learning encourages me to be more independent in my studies" (Mean=4.19, SD=1.097). The next responses were A1.

"I feel motivated to attend online classes" and A2. "Online learning helps me manage my study time more effectively" showed equal mean results which are (Mean=4.12) and A4. "I feel comfortable interacting with lecturers during online classes" (Mean=4.06, SD=1.185). However, the medium mean score (Mean=3.3398, SD=1.50741) was obtained for the statement A5. "I don't feel confident expressing my ideas during online discussions".

Table 5: Frequency level of Online Practice of students through engagement in Online Learning activities

Items	Mean	SD	Min	Max	Level
P1. I attend scheduled online classes.	4.58	0.788	1	5	High
P2. I actively participate in online class discussions (chat, microphone, or forum).	3.99	1.198	1	5	High
P3. I complete and submit online assignments on time.	4.43	0.922	1	5	High
P4. I watch recorded lectures provided by lecturers.	4.22	1.103	1	5	High
P5. I choose not to communicate with lecturers through online platforms when I have questions. (Reverse-coded)	3.4414	1.47279	1.00	5.00	Medium
P6. I collaborate with classmates using online tools for group assignments.	4.41	0.937	1	5	High
P7. I regularly check online learning platforms for announcements and updates.	4.39	0.972	1	5	High

Note: 1.00-2.50, low; 2.51-3.50, medium; 3.51-5.00, high.

According to Table 5, the actual practice of students through engagement in online learning is generally high. As shown in Table 5, for the statement P1. "I attend scheduled online classes" showed a higher mean score of 4.58, SD= 0.788. The other statements also obtained a high level mean score included the P3. "I complete and submit online assignments on time" (Mean=4.43, SD=0.922), P6. "I collaborate with classmates using online tools for group assignments" (Mean=4.41, SD=0.937), P7. "I regularly check online learning platforms for announcements and updates" (Mean=4.39, SD=0.972), P4. "I watch recorded lectures provided by lecturers" (Mean=4.22, SD=1.103) and P2. "I actively participate in online class discussions (chat, microphone, or forum)" obtained a mean of 3.99 and SD=1.198. However, the statements for P5. "I choose not to communicate with lecturers through online platforms when I have questions" showed a medium mean score of 3.4414, SD=1.47279.

One-Way ANOVA analysis

Table 6: One-Way ANOVA Test on Attitude and Students' Age

Age	N	Mean	Std. Deviation	Test of Homogeneity of Variances		Annova	
				Levene Statistic	Sig.	F	Sig.
18-20 years old	96	3.5179	0.59833	1.503	.214	1.982	.117
21-23 years old	141	3.6535	0.48931				
24-26 years old	17	3.6387	0.40127				
27-29 years old	2	4.1429	0.40406				

Based on the result from Table 6, there is no statistically significant difference in attitude across the four age groups, $F(3,252)=1.982$, $p=.117$. Prior to interpreting the Annova test, Levene's Test for Homogeneity of Variances was evaluated, showing that the assumptions of equal variances were met, $L=1.503$, $p=.214$. Although participants aged 27-29 years old reported the highest mean attitude score ($M= 4.1429$, $SD=0.40406$), followed by those aged 21-23 years old ($M=3.6535$, $SD=0.48931$), 24-26 years old ($M=3.6387$, $SD=0.40127$) and 18-20 years old ($M=3.5179$, $SD=0.59833$), the overall differences among these age categories were not statistically significant at the $\alpha=.05$ level.

Table 7: One-Way ANOVA Test on Attitude and Course

Course	N	Mean	Std. Deviation	Levene Statistic	Sig.	F	Sig
Diploma	116	3.58	.561	.714	.399	.692	.406
Degree	140	3.63	.504				

Note: Levene Statistic $df = (1, 254)$. ANOVA $df = (1, 254)$. No post-hoc test was conducted, as course of study has only two levels (Diploma, Degree) and the ANOVA result was not statistically significant ($p > .05$).

Based on table 7, participants were divided into two groups (Diploma, Degree). The ANOVA results show that the Attitude scores of the groups did not differ significantly ($F(1, 254) = 0.692$, $p = .406$). Since the Levene Statistic was not significant ($p = .399$), equal variance was assumed. However, since the overall ANOVA was not significant, and the course consists of only two groups, no post-hoc test was required. Post-hoc comparisons are only needed when there are three or more groups to identify which specific pairs differ, with two groups, the ANOVA (equivalent to an independent-samples t-test) already indicates whether diploma

and degree differ, and in this case, they do not.

Table 8 : One-Way ANOVA Test on Attitude and Gender

Gender	N	Mean	Std.Deviation	Levene Statistic	Sig.	F	Sig
Male	101	3.65	.549	.224	.637	.990	.321
Female	155	3.57	.519				

Based on table 8, the test is to know the attitude of students towards online learning differs between male and female students. The ANOVA results show that the Attitude scores of the groups did not differ significantly ($F(1, 254) = 0.990$, $p = .321$). Since the overall ANOVA was not significant, and gender consists of only two groups, no post-hoc test was required.

Pearson Correlation analysis

Table 9: Pearson Correlation analysis

	Knowledge	Attitude	Practice
Knowledge	1		
Attitude	.407**	1	
Practice	.642**	.561**	1

Note: Correlation is significant at the 0.001 level (2-tailed). N=256

Based on Table 9, the result of the Pearson Correlation analyses of Knowledge and Practice was found to be moderately positive and statistically significant ($r = .642$, $p < .001$). This shows that an increase in students' knowledge of online learning would lead to higher practice and engagement in online learning activities. Therefore, H1 is supported. Which demonstrated knowledge has a significant connection with practice towards online learning among students. Secondly, the Pearson Correlation of Attitude and Practice was found to be moderately positive and statistically significant ($r = .561$, $p < .001$). This shows that an increase in students' positive attitude towards online learning would lead to higher practice and engagement in online learning activities. Meaning that attitude has a significant relationship with practice towards online learning among students.

DISCUSSION

Discussion on Knowledge of Online Learning

The findings show that students demonstrate a very high level of knowledge regarding online learning tools. ($M = 4.5052$). This indicates that most students are able to use online platforms for online learning purposes and highly familiar with online learning technologies.

The six items variables behind this section show similar results, but only one item is different in result. The only question lower than other which is K5, which has been reversely coded on the awareness of basic platform features such as chat, discussion forums, file updates and attendance ($M = 3.9531$). This indicates that students are confident with the online application tools in broader terms, but there is still some features that they are lacking knowledge of. This can be supported by Vaszkun and Szakács (2025), who study how digital skills are measured. With the use of a tool called DIGCOMP that measures several skills separately because a single score was not able to show real distinction in different areas in regard to student digital skills.

The other five items also indicate high levels of knowledge, likely because online learning has become a core mode of teaching and learning since the COVID-19 pandemic. These findings are consistent with other KAP-based studies on e-learning (Visalam et al., 2015). A KAP survey among medical undergraduate students found that more than half of the respondents were comfortable using software tools and online resource databases for study purposes, suggesting that students generally possess adequate digital skills when they have access to computers and digital resources. This implies that operational knowledge of digital platforms develops over time through repeated exposure. Similarly, Vaszkun and Szakács (2025) found that online learning effectiveness is directly influenced by students' digital literacy, including their ability to use software, navigate platforms, and manage digital tasks. Therefore, students' strong knowledge may be attributed to the compulsory use of online platforms for coursework rather than personal choice. Overall, these findings suggest that knowledge develops steadily through required platform use and support Visalam et al.'s (2015) conclusion that digital skills are rarely the main barrier in online learning KAP studies. The results also suggest that university efforts to require the use of common online learning platforms can strengthen students' digital knowledge, even in contexts where infrastructure access remains limited, as noted by Jafar et al. (2022).

Discussion on Attitude of Online Learning

The findings show that respondents' attitude level towards online learning is highly positive ($M = 4.0419$). The standard deviation score of ($SD = 0.92413$) however, is shown to be the highest among all three constructs. It indicates greater variance in opinion whereby some students might have mixed feelings with online learning.

All seven items closely show that this high score is not evenly distributed. Six of seven scored high, as shown in Table 3.2. One item was moderate, which is A5, a reversed-coded item about confidence in speaking up during online learning discussions ($M = 3.34$). A similar study by Ho et al. (2023) reveals that students' quietness and lack of participation in online discussion are caused by a lack of confidence. Many students indicated that they do not feel confident speaking during online classes and prefer communicating through the chat function rather than speaking, suggesting that verbal participation remains a challenge in virtual learning environments.

This can be seen by students as an example, whereby online discussion still lacks two-way communication between students and lecturers and voluntary opinion sharing. Some students prefer to just listen to the lecture without asking questions and interact with the lecturer when they're asked due to lack of confidence in opinion sharing. Jafar et al. (2022) helps break down why students feel this way, especially in Sabah. Two components arise, which is the first one, feeling socially isolated, and the second, finding a learning environment as inconducive. It means less social contact could make students more hesitant to speak up during live discussion.

The highest score is the highest score of all, most students preferred a mix of online and face-to-face learning over either one alone (A7, $M = 4.26$). The result indicated that students value face-to-face interaction for teamwork, physical lectures also tend to boost student concentration and the communicative environment between the students and lecturer and student to student. Students also seem to see online and traditional learning as complementary approaches that together offer a more effective learning experience rather than as competing strategies. This situation is backed by Garrison and Kanuka (2004), who argued that blended learning compliments the strengths of online and physical learning and promotes effective learning. This suggests that the blended learning strategy receives high acceptance among students. However, as online learning is widely applicable to students, lack of confidence in online learning discussions also persists.

Discussion of Practice of Online Learning

The findings show a high level of online learning practice ($M = 4.2104$). With a frequency-based approach, the questions are seven in total, and they have the widest spread of answers among the three areas.

As shown in Table 3.3, six items scored high with fairly relatable answers. However (P2, $M = 3.99$), taking part in class discussions through chat, microphone, or forum is noticeably lower than other items. Meanwhile, the reverse-coded questions (P5, $M = 3.4414$), choosing not to contact lecturers when they have questions, have dropped to medium. Students are more engaged with attendance, assignment submissions, using online

databases for research material, and using the platform effectively for the purpose mentioned, but less when it comes to online interaction, such as reaching out to lecturers when they have questions and speaking up in discussions.

Martin and Bollinger (2018) explain and find that student and lecturer interaction is one of the most challenging aspects of online education. Their study found that despite students' engagement and appreciating regular interaction with the lecturer, many are not participating voluntarily unless lecturers intentionally create an engagement and opportunities for interaction because they are highly influenced by a lack of confidence and anxiety to express themselves publicly. Another study by Aguilera-Hermida (2020) also supports this. According to the study, although completion of online learning tasks and online tools is used effectively to study, the interactive components of online learning remained low.

Discussion on Comparison Analyses

The findings show that there is no significant differences in respondents' attitudes to online learning by age, gender and course. In terms of age, it indicates that age has less influence on students' attitudes to online learning and demonstrates similar attitudes regardless of different age groups. This can also indicate that despite different ages, generation Z have the same motivation and generally accept blended learning because students value both learning methods. This is consistent with Ahmed et al. (2022), whereby students benefit from the flexibility of online learning while believing in opportunities that physical learning provides.

In terms of gender and course, the results indicate fewer differences statistically for both male and female students, as well as students enrolled in the diploma and degree programmes, suggesting similar attitudes towards online learning. This result is rational due to the fact that despite different genders and courses, students use the same platform and experience the same university guidelines and policies as well as the same academic requirements.

Discussion on Pearson Correlation

Pearson correlations were used to test a significant relationship between knowledge, attitude and practice and to test if the hypotheses supported. The results of the relationship between Knowledge and Practice of online learning revealed a moderately positive and significant correlation by statistic. It indicates that the hypothesis (H1) was supported. The positive correlation suggests that when students have high levels of knowledge in online platform features and digital learning tools such as UFuture, Google Meet, Zoom, Emerald etc., they are prone to actively engage with online learning activities such as online discussion and online assessments and are able to submit assignment on time. According to a previous study, the effectiveness of online learning is directly impacted by students' digital literacy, which includes their ability to use software tools, navigate platforms, and manage digital tasks (Vaszkun & Szakács, 2025). It indicates online learning usage is effective when students know how to use it, which makes a rational point.

Next, the result of the relationship between Attitude and Practice of online learning also revealed a moderately positive and significant correlation by statistic. It indicates that the hypothesis (H2) was supported. This suggests that when students have good attitudes towards online learning, such as feeling motivated, confident, interested and comfortable, they are more engaged and use online platforms often. A positive attitude may also help students to actively interact with lecturers during online discussions and be free to express their opinions. This can strengthen the online learning effectiveness, especially in terms of communication. The result is also similar to a previous study suggesting that when students have a positive attitude towards e-learning, they will use it often in the future (Barz et al., 2024).

CONCLUSION

In conclusion, this study examines the knowledge, attitudes and practices of higher learning institutions students regarding online learning, especially in Sabah. In general, the results are positive. Students use online learning platforms, such as Google Classroom, Microsoft Teams and others that they need for their studies easily. They were able to use the materials, join video classes and submit assignments with solid knowledge, meaning that they had developed their digital skills.

Overall student sentiment towards online learning was also largely positive, although it was the area with the most mixed reactions of the three. Students generally enjoy the flexibility that online learning provides them and they prefer to take a combination of online and in-person classes rather than either mode alone. However, one thing was clear, many students reported that they were not confident in asserting themselves and sharing their opinions in online discussions. This is supported by Martin and Bollinger (2018), who found that students' unwillingness to participate in online discussion is highly influenced by lack of confidence and anxiety to express themselves publicly. That's the same thing that happens when it comes to how students interact with teachers during class, and when they do their assignments on time and without any problems, they tend to refrain from talking to the teacher or joining in the discussion.

Interestingly, gender, age, and course of study did not appear to have much impact on students' perceptions of online learning, indicating that students generally experienced a fairly similar learning environment across these factors. What emerges is the relationship between knowledge, attitude and practice. Many students who are interactive in their online learning. In short, students are technically capable and generally participate in online learning, but they need to be encouraged to be more confident in speaking up and participating in class discussions. Universities and lecturers may pay more attention to providing a learning environment that allows students to feel comfortable asking questions and participating in discussions, rather than working independently on their own assignments. To do so, online learning may not only be something students can do but also something they believe in.

Ethics Statements

Ethical approval for this study was obtained from the Research Ethics Committee, Faculty of Administrative Science and Policy Studies, UiTM on 16 June 2026 (Approval Number: BERC/24/2026/MR663) Data Collection Data collection for this study was conducted after ethical approval obtained from Research Ethics Committee, Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM). All respondents provided consent before completing the study, and participation was voluntary. All data collected were deidentified with respect to the respondent.

ACKNOWLEDGEMENTS

The researchers are genuinely grateful to the respondents among Faculty of Administrative Science and Policy Studies students that contributed through answering the survey honestly and unbiasedly, the Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM) for giving the opportunities to conduct a research that enhanced students experiences and skills in data collection and journal writing.

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