

## ORIGINAL ARTICLE

# Association Between Level of Knowledge Gained, Confidence, Motivation and Flexibility on Types of Learning for Bedside Teaching Among Clinical Students in Four Malaysian Medical Schools During COVID-19 Pandemic

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## ABSTRACT

**Introduction:** With the arise of the COVID-19 pandemic, higher institutions are forced to change the method of delivery for bedside teaching sessions from face-to-face to online learning. However, online learning was found not effective in delivering practical knowledge and skills to students. Hence, the objective of this study was to determine the association between level of knowledge gained, confidence, motivation and flexibility on types of learning for bedside teaching sessions among clinical students in four Malaysian medical schools during COVID-19 pandemic.

**Methods:** A cross-sectional study involving medical students from Universiti Putra Malaysia (UPM), Universiti Sains Islam Malaysia (USIM), Universiti Islam Antarabangsa (UIA) and Universiti Sains Malaysia (USM) were conducted from 1st March 2021 until 6th June 2021. An online questionnaire was distributed and it consisted of 5 sections which cover sociodemographic information, level of knowledge gained, confidence, motivation, and flexibility from bedside teaching session. The data was analysed by using SPSS software program. **Results:** There is a significant association between the level of knowledge gained, level of confidence, level of motivation and level of flexibility with the type of learning (online or face-to-face) during bedside teaching sessions. Results revealed that students gained a higher level of knowledge (84.9%), higher level of confidence in physical examination (93.3%), higher motivation (82.2%) and higher flexibility (64.1%) during face-to-face bedside teaching sessions compared to online learning.

**Conclusion:** Most of the medical students in four Malaysian medical schools prefer face-to-face learning compared to online learning for bedside teaching sessions.

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crucial in their educational sector (1). However, with the arise of COVID-19 pandemic, higher institutions are forced to change the method of delivery for practical sessions from face to face to online learning.

## INTRODUCTION

At a tertiary education level, practical skills are very essential in order for students to be able to apply their theoretical knowledge in real life aspects. Practical classes allow students to learn on how to approach a problem, to observe and synthesize their observations. It also engage the students with the practical skills via hands on experience and experimental methods that are

Traditional learning can be defined as a course in which all content is delivered in a standard face-to-face environment only (2). Traditional classrooms were referred to rooms that consist of clean walls and rows of desks and chairs facing a lectern (3). Based on the definitions above, traditional learning can be defined as all content of a course is being delivered face-to-face inside a classroom or a hall.

Whereas online learning can be defined as learning at home using computers and online courses (4). The term online learning applies commonly to any electronically aided teaching and is often associated with computer and internet instruction (5). Therefore, online learning can be generally defined as a course delivered to the students with the aid of electronic devices without being physically present in the classroom.

Bedside teaching is a training for all medical undergraduates which involves case discussions and application of clinical skills with real patients (3). It helps medical students to acquire humanistic skills and professional attitude during history taking, physical examination, final diagnosis as well as developing a doctor-patient relationship (6).

The aims of this study were to identify the preferences of students between online and face-to-face bedside teaching session in terms of knowledge gained, confidence, motivation and flexibility; and to identify the effectiveness of the bedside teaching sessions conducted online. Furthermore, this study is aimed to determine the association between level of knowledge gained, confidence, motivation and flexibility on types of learning; either face-to-face or online learning, for bedside teaching sessions in four Malaysian medical schools during COVID-19 pandemic. The finding is important to assess the effectiveness of these two methods of bedside teaching

## **MATERIALS AND METHODS**

### **Study population**

This study was a cross-sectional study conducted among a clinical year medical students from Universiti Putra Malaysia (UPM), Universiti Sains Islam Malaysia (USIM), Universiti Islam Antarabangsa (UIA) and Universiti Sains Malaysia (USM). Simple random sampling was used.

### **Instrument**

The questionnaire was adapted from Alshoufi et al and Baker et al (7-8) studies with slight modification in the sociodemographic section. The questionnaire consisted of 5 sections which covered a sociodemographic information, level of knowledge gained from bedside teaching sessions, level of confidence, level of motivation, and level of flexibility. All of the sections except for the sociodemographic information, were assessed by using a 5-Likert scale.

A scoring system was applied using the 5-Likert scale; 5 points were assigned to "strongly agree," and 1 point was assigned to "strongly disagree". The total score was further divided into three groups which were low, moderate and high (9). Total level of knowledge and confidence gained from bedside teaching sessions was 15 and the score was further group into low (3-

6), moderate (7-11) and high (12-15). For the , level of motivation of confidence, the total score was 10, thus further group into low (2-4), moderate (5-7) and high (8-10). ,level of motivation, and level of flexibility total score was 25, so the division was made as low (5-10), moderate (11-19) and high (20-25) ranged from 2 to 20 points for each response each response on face-to-face and online learning.

The first section was the sociodemographic data consisting of information about age, gender, course and year of study. The second section was the level of knowledge gained from bedside teaching. This section can be used to determine the quality of learning in bedside teaching sessions in both online and face-to-face learning. The third section was regarding level of confidence. Students were assessed on their confidence to perform physical examination skills by themselves after the bedside teaching sessions, both online and face-to-face learning. The fourth section of the questionnaire was on the level of motivation. In this section, the feelings and motivation towards online and face-to-face bedside teaching sessions were assessed. The fifth section was about the level of flexibility. In this section, students were assessed on the flexibility of joining the class in both online and face-to-face bedside teaching session.

### **Ethics statement**

This research was conducted with the approvals from JKEUPM (Ethics Committee of Research Involving Human Subject of Universiti Putra Malaysia), JEPeM (Human Research Ethics Committee USM), Universiti Sains Islam Malaysia (USIM) and Universiti Islam Antarabangsa (UIA). The reference numbers were JKEUPM-2021-072 and USM/JEPeM/21030210. The confidentiality of respondents' data was maintained throughout the study. Prior to conducting the research, consent was obtained from each of the participants.

### **Statistical analysis**

The data was analysed by using Statistical Package for the Social Sciences (SPSS) software program. Descriptive statistics such as percentages and frequency were calculated for sociodemographic information, level of knowledge gained, confidence, motivation and flexibility. Chi-square test was used to compare between two categorical data and association between level of knowledge gained, confidence, motivation and flexibility on types of learning for bedside teaching sessions. Statistical significance for all analyses was considered at  $p < 0.05$ .

## **RESULT**

### **Sociodemographic characteristics**

Among 1364 questionnaires that were distributed to all clinical students in UPM, USIM, UIA and USM, only 347 questionnaires were collected. The response

rate was 25.4% and this value achieved our calculated sample size. Majority of the respondents aged between 22 (47.6%) and 23 (33.4%) years old. 263 (75.8%) of them were females and 84 (24.2%) of them were males. Students from Universiti Putra Malaysia recorded the highest distribution (38.0%), followed by Universiti Sains Malaysia (22.2%), Universiti Sains Islam Malaysia (21.0%) and Universiti Islam Antarabangsa (18.7%). Majority of the respondents were from Year 3 (50.1%).

### Level of knowledge gained from bedside teaching session among respondents

43.5% of the respondents strongly agreed that face-to-face bedside teaching session provide them a deeper knowledge of the course content while for an online bedside teaching, 38.9% remained neutral with this statement. Most of the respondents (46.4%) agreed that face-to-face bedside teaching sessions help them to understand the course concepts better, while in online bedside teaching session 36.3% were neutral regarding this matter. 47.0% of the respondents strongly agreed that face-to-face bedside teaching session would be a better way for them to learn the course material while 35.7% were neutral about it in online bedside teaching session (Table I).

**Table I: Frequency Distribution of Level of Knowledge Gained Based on Types of Learning (n=347)**

No	Items	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Online Learning						
1	An online environment can provide me with a deeper knowledge of the course content.	30 (8.6)	94 (27.1)	135 (38.9)	79 (22.8)	9 (2.6)
2	Online learning helps me to understand the course concepts better.	35 (10.1)	99 (28.5)	126 (36.3)	82 (23.6)	5 (1.4)
3	Online learning would be a better way for me to learn the content/course materials.	50 (14.4)	101 (29.1)	124 (35.7)	62 (17.9)	10 (2.9)
Face-to-Face Learning						
1	Face-to-face learning can provide me with a deeper knowledge of the course content.	1 (0.3)	1 (0.3)	34 (9.8)	160 (46.1)	151 (43.5)

CONTINUE

**Table I: Frequency Distribution of Level of Knowledge Gained Based on Types of Learning (n=347) (cont.)**

No	Items	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
2	Face-to-face learning helps me to understand the course concepts better.	2 (0.6)	1 (0.3)	30 (8.6)	161 (46.4)	153 (44.1)
3	Face-to-face learning would be a better way for me to learn the content/course materials.	1 (0.3)	1 (0.3)	38 (11.0)	144 (41.5)	163 (47.0)

### Level of confidence during bedside teaching sessions among respondents

Almost half of the respondents (46.4%) agreed that they were able to perform physical examination by themselves without any assistance during face-to-face bedside teaching session, while 47.0% of the respondents disagreed regarding this matter in online bedside teaching session. 43.8% of respondents agreed that they were able to solve a clinical case without any assistance during face-to-face bedside teaching sessions, while in online bedside teaching sessions, 41.2% of them disagreed. 43.2% of them agreed that face-to-face bedside teaching sessions helped them to understand the procedure better, while 38.9% of them disagreed that online bedside teaching would help them to understand the procedure better (Table II).

**Table II: Frequency Distribution of Level of Confidence Based on Types of Learning (n=347)**

No	Items	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Online Learning						
1	I am able to perform the physical examination by myself without any assistance.	58 (16.7)	163 (47.0)	83 (23.9)	38 (11.0)	5 (1.4)
2	I can decide how to solve a clinical case without any assistance.	57 (16.4)	143 (41.2)	111 (32.0)	35 (10.1)	1 (0.3)
3	I am able to understand the procedure better in online learning.	67 (19.3)	135 (38.9)	103 (29.7)	36 (10.4)	6 (1.7)

CONTINUE

**Table II: Frequency Distribution of Level of Confidence Based on Types of Learning (n=347) (cont.)**

No	Items	1- Strongly Dis-agree	2- Dis-agree	3- Neu-tral	4- Agree	5- Stro ngly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Face-to-Face Learning						
1	I am able to perform the physical examination by myself without any assistance.	2 (0.6)	22 (6.3)	80 (23.1)	161 (46.4)	82 (23.6)
2	I can decide how to solve a clinical case without <b>any</b> assistance.	3 (0.9)	32 (9.2)	92 (26.5)	152 (43.8)	68 (19.6)
3	I am able to understand the procedure better in face-to-face learning.	2 (0.6)	4 (1.2)	45 (13.0)	150 (43.2)	146 (42.1)

**Level of motivation during bedside teaching session among respondents**

Most of the respondents (46.1%) agreed that they were excited to attend the face-to-face bedside teaching session while 45.2% of them remained neutral in the online bedside teaching session. Almost half of them (47.8%) agreed that they were able to stay motivated each time they attend face-to-face bedside teaching while 40.6% of them were neutral in online bedside teaching session (Table III).

**Table III: Frequency Distribution of Level of Motivation Based on Types of Learning (n=347)**

No	Items	1- Stro ngly Dis-agree	2- Dis-agree	3- Neu-tral	4- Agree	5- Stro ngly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Online Learning						
1	I am excited to attend online bedside teaching sessions.	38 (11.0)	89 (25.6)	157 (45.2)	49 (14.1)	14 (4.0)
2	I am able to motivate myself each time I attend online bedside teaching sessions.	39 (11.2)	76 (21.9)	141 (40.6)	79 (22.8)	12 (3.5)
Face-to-Face Learning						
1	I am excited to attend face-to-face bedside teaching sessions.	1 (0.3)	4 (1.2)	68 (19.6)	160 (46.1)	114 (32.9)

CONTINUE

**Table III: Frequency Distribution of Level of Motivation Based on Types of Learning (n=347) (cont.)**

No	Items	1- Stro ngly Dis-agree	2- Dis-agree	3- Neu-tral	4- Agree	5- Stro ngly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
2	I am able to motivate myself each time I attend face-to-face bedside teaching sessions.	0 (0)	4 (1.2)	63 (18.2)	166 (47.8)	114 (32.9)

**Level of flexibility for bedside teaching sessions among respondents**

37.2% of the respondents agreed that face-to-face bedside teaching session did not interrupt with their schedule, while 36.9% of them remained neutral regarding this in online bedside teaching session. 43.2% of them agreed that practical bedside teaching session can be attended in any kind of environment, while 28.0% were neutral about this in online bedside teaching sessions. 36.0% of respondents agreed that face-to-face learning is less expensive while 36.0% were neutral that online learning is less expensive. Almost half of them (47.0%) agreed that they were well-equipped in face-to-face bedside teaching session while 44.4% of them also agreed that they were well-equipped for online bedside teaching session (Table IV).

**Table IV: Frequency Distribution of Level of Flexibility Based on Types of Learning (n=347)**

No	Items	1- Stro ngly Dis-agree	2- Dis-agree	3- Neu-tral	4- Agree	5- Stro ngly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Online Learning						
1	The online classes do not interrupt with my daily schedule.	30 (8.6)	66 (19.0)	128 (36.9)	95 (27.4)	28 (8.1)
2	I can attend my online <b>bedside</b> teaching sessions in any kind of environment.	35 (10.1)	85 (24.5)	97 (28.0)	96 (27.7)	34 (9.8)
3	Online learning is less expensive.	25 (7.2)	6 (17.3)	125 (36.0)	100 (28.8)	37 (10.7)
4	I am well-equipped (electronic devices, internet) for online learning.	16 (4.6)	30 (8.6)	73 (21.0)	154 (44.4)	74 (21.3)

CONTINUE

**Table IV: Frequency Distribution of Level of Flexibility Based on Types of Learning (n=347) (cont.)**

No	Items	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
		n (%)	n (%)	n (%)	n (%)	n (%)
Face-to-Face Learning						
1	The face-to-face classes do not interrupt with my daily schedule.	2 (0.6)	23 (6.6)	120 (34.6)	129 (37.2)	73 (21.0)
2	I can attend my bedside teaching sessions in any kind of environment.	5 (1.4)	28 (8.1)	103 (29.7)	150 (43.2)	61 (17.6)
3	The face-to-face learning is less expensive.	4 (1.2)	36 (10.4)	121 (34.9)	125 (36.0)	61 (17.6)
4	I am well-equipped (white coat, neuro examination kit) for face-to-face practical.	2 (0.6)	8 (2.3)	53 (15.3)	163 (47.0)	121 (34.9)

**Association between level of knowledge gained and types of learning for bedside teaching session among the respondents**

There is a statistically significant association between level of knowledge gained ( $p < 0.001$ ) with the types of learning for bedside teaching. 84.9% of the respondents acquired high level of knowledge gained in face-to-face classes while only 15.1% of them acquired high knowledge in online classes (Table V).

**Association between level of confidence and types of learning for bedside teaching session among the respondents**

There is a statistically significant association between level of confidence ( $p < 0.001$ ) with the types of learning for bedside teaching. 93.3% of the respondents had high level of confidence to perform clinical examinations in face-to-face learning, while only 6.7% had high confidence in performing the physical examination in online learning (Table V).

**Association between level of motivation and types of learning for bedside teaching session among the respondents**

There is a statistically significant association between level of motivation ( $p < 0.001$ ) with the types of learning for bedside teaching sessions. 82.2% of the respondents had high motivation to attend the face-to-face bedside teaching session while only 17.8% of them felt highly motivated to attend the online bedside teaching session (Table V).

**Table V: Association between Level of Knowledge Gained, Confidence, Motivation, Flexibility and Types of Learning for Bedside Teaching Session**

Variable	Types of Learning		Statistical Test	
	Online Learning (%)	Face-to-Face Learning (%)	X <sup>2</sup>	P-value
Level of Knowledge Gained				
Low	102 (99.0)	1 (1.0)	366.318	0.000
Moderate	191 (81.6)	43 (18.4)		
High	54 (15.1)	303 (84.9)		
Level of Confidence				
Low	154 (96.9)	5 (3.1)	330.278	0.000
Moderate	177 (59.8)	119 (40.2)		
High	16 (6.7)	223 (93.9)		
Level of Motivation				
Low	100 (96.2)	4 (3.8)	271.203	0.000
Moderate	189 (71.3)	76 (28.7)		
High	58 (17.8)	267 (82.8)		
Level of Flexibility				
Low	32 (97.0)	1 (3.0)	50.605	0.000
Moderate	231 (54.1)	196 (45.9)		
High	84 (35.9)	150 (64.1)		

**Association between level of flexibility and types of learning for bedside teaching session among the respondents**

There is a statistically significant association between level of flexibility ( $p < 0.001$ ) with the types of learning for bedside teaching session. 64.1% of the respondents felt that face-to-face bedside teaching were highly flexible while only 35.9% of them felt that online bedside teaching sessions provided high flexibility (Table V).

**DISCUSSION**

Our study shows that there was a significant association between level of knowledge gained and types of learning (online and face-to-face) for bedside teaching sessions with more students (87.3%) gaining high knowledge in face-to-face compared to online bedside teaching session. This is similar to a study which stated that there was a significant association between amount of knowledge acquired and type of learning with face-to-face learning being higher than online learning in terms of amount of knowledge acquired (10). Students perceived that face-to-face learning environments provide them a deeper knowledge of course content compared to online learning (8). This was believed due to better interaction between students and lecturers in face-to-face bedside teaching sessions. Similar to a previous study which reported that poor interaction between peers and instructors causes lack of clarity on the learning goals which delays the learning process (11). However, our results did not correlate with a study that showed there was no significant association between

the overall grade score of students' clinical examination in the bedside teaching group and video demonstration group (12). This difference could be due to the variable and more sophisticated features provided in the video demonstration which are able to observe a clear virtual patient and able to take notes. Hence, our study had shown that students were able to get more knowledge in face-to-face bedside teaching session compared to online bedside teaching session.

Next, there was a significant association between level of confidence and type of learning (online or face-to-face) for bedside teaching sessions with more respondents (64.3%) having high confidence in face-to-face compared to online bedside teaching sessions. This correlated with a study which stated that e-learning is less effective than face-to-face learning in terms of increasing the student's clinical skills (11). Learning face-to-face with real patients in a real clinical setting is vital for medical education (13). This is because real time interactions between medical students and patients is important to acquire important clinical skills. This is similar to a study which stated that skills that were required to be a clinician such as history taking, physical diagnosis, patient communication, empathy and professionalism were only able to be learned in face-to-face bedside teaching (14). In order to understand clinical reasoning which is linked to presentation of patients and knowledge regarding clinical diseases, it definitely requires real-life patient experiences (13). Hence, our study had shown that students were more confident in doing physical examinations in face-to-face bedside teaching session compared to online bedside teaching session.

There was a significant association between level of motivation and types of learning (online and face-to-face) for bedside teaching sessions with more respondents (82.2%) having high motivation in face-to-face compared to online bedside teaching sessions. This correlates with the result from a previous study which showed that there was a significant association between level of learning motivation and types of learning (online or traditional) among students with high learning motivation in traditional compared to online learning (10). 81% Majority of the students had decreased motivation in online learning (15). This could be due to less engagement between students and lectures during online practical sessions made them feel isolated and unmotivated to attend it (15). There was a concern that all students not being present in the same location at the same time will reduce the opportunities to interact with each other which can lead to negative experiences, such as feelings of isolation, frustration,

anxiety, and confusion (16). A study reported that most of 76.6% students felt the motivating factor in face-to-face classes is eye contact and body language which improves communication between students and lecturers (17). Hence, our study had shown that students were more motivated to attend face-to-face bedside teaching session compared to online bedside teaching session.

There was a significant association between level of flexibility and type of learning (online or face-to-face) for bedside teaching sessions with more respondents (64.1%) felt that face-to-face bedside teaching session have higher level of flexibility compared to online bedside teaching session. This does not correlate with the previous study result which showed that e-learning is more flexible and convenient than conventional learning (7). Our study respondents felt that face-to-face learning suits better with their daily schedules and can be attended in any kind of environment. This correlates with a study which stated that face-to-face classes were more instructor-led and have a set timetable, thus students can manage their time and fit the classes into their daily schedules (16). In terms of costs, there was not much significant difference between online and face-to-face learning and respondents felt that both online learning and face-to-face learning were less expensive. This does not correlate with a study that stated most of the students prefer online learning as it saves their time and money (18). Online learning requires students to have requisite technology and study spaces which are necessary to learn effectively (15). Hence, our study had shown that students felt more flexible in face-to-face bedside teaching session compared to online bedside teaching session.

In view of COVID-19 pandemic, the need for social distancing and absent classes frequently forces the online learning to be implemented. Although this method is not really preferable for the medical students from four university, the benefits in term of health and safety of the students need to be a priority. A total of 100% online learning is unreasonable but to accommodate the current situation, combining online and face to face learning method for clinical year should be considerable.

## CONCLUSION

In conclusion, there was an association between level of knowledge gained, level of confidence, level of motivation and level of flexibility on types of learning (online and face-to-face) for bedside teaching sessions in four Malaysian medical schools during COVID-19 pandemic. Majority respondents prefer face-to-face bedside teaching sessions, which broaden their

knowledge boost their confidence and motivation as well as offer them more flexibility in term of learning and understanding as compared to online bedside teaching sessions. In the future, further study needs to be done in other medical schools in Malaysia and other countries. Further study needs to be performed in order to determine alternatives to bedside teaching, other than doing it online during pandemic. There should also be further study conducted on preclinical medical students.

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