

Received: 18 April 2020, Accepted: 14 October 2020, Published 13 November 2020

SMALL GROUP DISCUSSION USING WHATSAPP AS LEARNING & EVALUATION TOOL FOR NUTRITION & DIETETICS STUDENTS

Nurul Huda Razalli^{1*} & Mohd 'Adlan Mohd Shariffuddin²

**¹Center for Healthy Aging & Wellness (H-CARE) & Dietetics Programme,
Faculty of Health Sciences,
Universiti Kebangsaan Malaysia**

**²SMK Tengku Intan Zaharah,
Dungun, Terengganu, Malaysia**

Abstract

Small group discussion (SGD) using WhatsApp platform is a student-centred learning innovation to overcome the problems of lack of optimum preparation and participation by students when SGD is conducted in the classroom. Nutrition and dietetics undergraduate students (n=46) who enrolled for Multi-ethnic Cuisine & Etiquette course were given a task to conduct a group discussion on two topics using WhatsApp as part of their continuous assessment for this course. The instructor then evaluated group and individual participation and administered an online survey form to obtain students' reflection on the task. Survey items consisted of six clusters and rated on a five-point Likert scale. The results showed that Participation cluster obtained the highest average score of 4.46 ± 0.62 , followed by Learning (4.16 ± 0.73), Past Experience (4.14 ± 1.05), Attraction (3.99 ± 0.85), Implementation (3.96 ± 0.90) and Emotion cluster (3.88 ± 0.95). The results suggest that SGD using WhatsApp is a student-friendly, fun learning style and an easy evaluation tool for instructors to track individual participation and discussion content. SGD using WhatsApp diminishes the time required in the classroom conducting an ineffective discussion and inefficient evaluation by instructors. This innovation could be used as part of teaching and learning in many other courses to enhance students' learning experience and aid instructors in conducting a better evaluation.

Keywords: Evaluation tool; Group discussion; Learning tool; WhatsApp

1.0 INTRODUCTION

Small group discussion (SGD) is one of the student-centred teaching techniques where in its ideal state will allow students to generate new knowledge and deeper understanding on a

particular topic through active participation by all group members. It is a good approach in teaching and learning since learning activities conducted in small groups has been proven beneficial in the tertiary level education (Curran 2008; de Jong 2010; Ferreri 2013).

SGD is often being incorporated as a course evaluation to enhance participation of this group activity. However, it is tough if not impossible for the instructors or lecturers to evaluate individual participation in a classroom full of students during SGD thus giving an opportunity to some students to be a 'sleeping partner'. Moreover, when conducted in the classroom, SGD is often less effective as students are not well prepared with resources on the topic during the allocated discussion duration.

1.1 Teaching Cultural Foods and Etiquette to Nutrition & Dietetics Students

In order to be a good nutritionist and dietitian, nutrition professionals should know not just what type of food and the amount that their clients consume but also to be aware and understand on how food plays role in their culture. A client's ethnic and cultural background is one of the important factors that determines their diet. Realizing the importance of producing nutrition and dietetics graduates that are well versed on dietary intake and food habits across cultures and ethnic groups, many nutrition and dietetics programs in universities have started to incorporate food and culture related courses into their curricula. The better a nutrition or dietetics students' knowledge about different foods and dietary habits of various ethnic groups, the more effective nutrition or dietary advice could be given by taking cultural differences into consideration (Burrowes 2004).

1.2 WhatsApp in Teaching & Learning

WhatsApp is one of the leading messaging applications for smartphones in the world and the top messaging application used in Malaysia (Hootsuite & We Are Social 2020). It allows smartphone users to send text messages and other types of media (such as videos, voice messages and photos) to their contacts. Links to websites and documents sharing are also possible. It also facilitates the creation of groups which enables multiple users to participate in and monitor the conversation. Communications using this application are not only restricted to family members and friends but also include teacher-student interaction and professionals (Rosenberg and Asterhan 2018; Johnston 2015). In education, its usage can enhance teaching and learning experiences and achievements (Apiah 2016; Annamalai 2018). Teaching and learning activities on WhatsApp that are commonly utilised by teachers and educators include disseminating information to the students in the class WhatsApp group, and also maintaining

communication with students through both group and private messages.

The objectives of this innovation study were to help students engage in learning using a platform that is student-friendly, convenient, relaxing yet effective and to assist instructors in implementing student-centered learning that can also conveniently serve as an evaluation tool.

2.0 MATERIALS AND METHODS

2.1 Participants

This innovation study was participated by the second- and third-year nutrition and dietetics undergraduate students (n=46) who enrolled in the Multi-ethnic Cuisine & Etiquette course. Students were given a task to conduct a group discussion as part of their continuous assessment for this course.

WhatsApp application has been chosen as the medium of discussion to be conducted during weekend for the time limit of 48 hours at students' convenience instead of the traditional in-class discussion. A short briefing about the task was delivered by the instructor during class time. Two topics were selected to be discussed by the students in small groups namely herbs and spices, and Malay cuisine.

2.2 Instructions

The instructor then randomly divided the students into eight groups using the automatic group generator function that is available on the university's e-learning system. The maximum number of students was set to be six students per group. Next, the instructor created the groups and sent an invitation links for the students to join their respective groups.

After all the students had joined the created groups, the instructor posted the instructions on how the group discussion should be conducted. In detail, instructor posted few questions to be discussed by the students on each topic (Figure 1). Students were given freedom to naturally conduct the discussion using semiformal tone of language both in English and Bahasa Melayu, and use emoticons or emojis. They were also encouraged to share photos, videos, articles, files and links during the discussion (Figure 2). Throughout the entire discussion time, the instructor did not interfere or involve in the process.

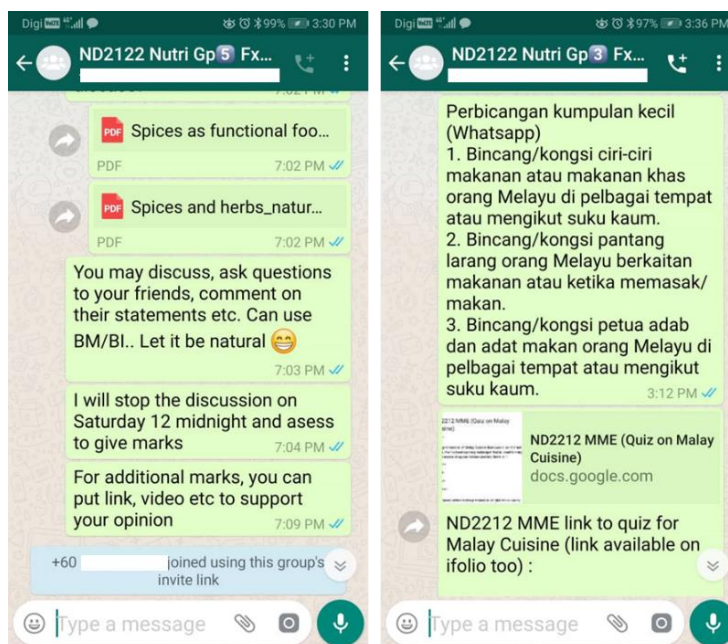


Figure 1: Screenshots of the instructions posted by the instructor in the WhatsApp group.

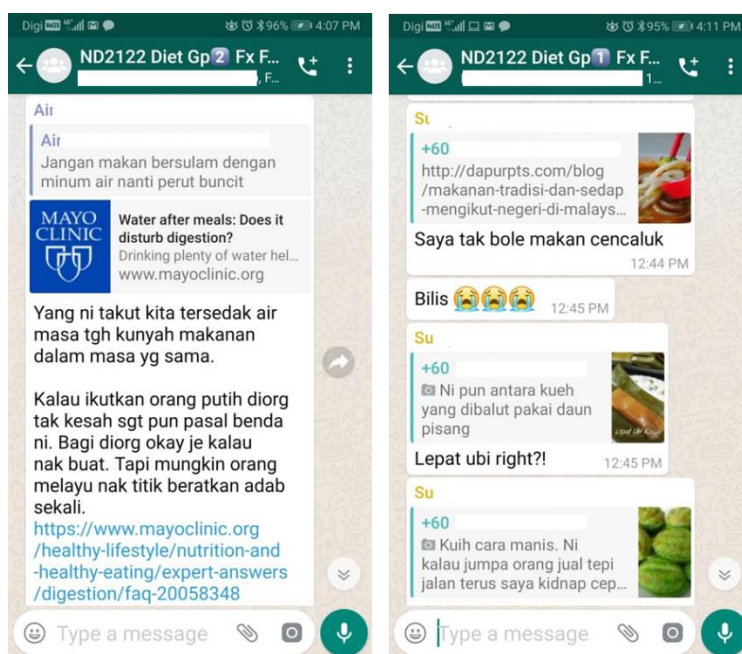


Figure 2: Screenshots of students' interactions in the WhatsApp group during discussion. Students conducted the discussion in a semiformal way using both English and Bahasa Melayu, and were encouraged to share information from various kinds of media.

2.3 Assessment

Assessment was conducted by the instructor on participation and the contents discussed during the 48-hour period, followed by students' reflection of the SGD using WhatsApp which were submitted online using Google Form.

The survey consisted of a series of 26 statements related to their experience using WhatsApp to conduct the group discussion to be rated on a five-point scale (1- strongly disagree, 2- disagree, 3- neutral, 4- agree, 5- strongly agree). The statements surveyed are characterised and grouped into six clusters – Past experience, Participation, Implementation, Learning, Attraction and Emotion (Table 1). In addition, students were also given the chance to provide their personal comments on the task given.

Table 1: Survey statements characterized into clusters.

Cluster	Item Code	Survey Statements
Past experience (PE)	PE1	This is my first experience having small group discussion (SGD) using WhatsApp.
	PE2	For my undergraduate studies, this is the first time the lecturer used WhatsApp platform to conduct SGD.
Participation (P)	P1	SGD using WhatsApp platform has allowed me to be actively involved in the discussion.
	P2	SGD using WhatsApp platform enabled me to share the information from my individual reading on the topic.
	P3	SGD using WhatsApp platform enabled me to share my personal experiences on the topic.
Implementation (I)	I1	I suggest SGD using WhatsApp platform to be implemented throughout this course.
	I2	I suggest SGD using WhatsApp platform to be implemented in other courses during my undergraduate studies.
	I3	I can discuss without any interruption from the lecturer in SGD using WhatsApp platform.
	I4	The lecturer has given me enough time for the discussion.
	I5	The number of students per group is suitable.
Learning (L)	L1	SGD using WhatsApp platform gave me chance to search for extra materials related to the topic.
	L2	SGD using WhatsApp platform led me to read journal articles to understand and deepen my knowledge on the topic.
	L3	SGD using WhatsApp platform led me to search for additional information (besides journal articles) to understand and deepen my knowledge on the topic.
	L4	SGD using WhatsApp platform has given me opportunity to do in

		dividual reading on the topic.
	L5	I have better understanding on the topic after the SGD using WhatsApp platform session.
	L6	SGD using WhatsApp platform is effective for me to understand the topic.
<hr/>		
Attraction (A)	A1	If the discussion session is conducted in class, I have no time to do additional reading or reference compared to SGD using WhatsApp platform.
	A2	I have problem to highlight myself if the discussion is done in class compared to SGD using WhatsApp platform.
	A3	SGD using WhatsApp platform increased my curiosity on this topic.
	A4	I could still learn about the topic even though the medium used is chatting through WhatsApp (on the topic) with my classmates.
<hr/>		
Emotion (E)	E1	SGD using WhatsApp platform attracted me to take part in the discussion.
	E2	SGD using WhatsApp platform attracted me to learn about the topic.
	E3	I prefer to use SGD using WhatsApp as part of learning method.
	E4	I prefer SGD using WhatsApp to be included as part of course assessment.
	E5	I feel less confident if the discussion is done in class compared to SGD using WhatsApp platform.
	E6	SGD using WhatsApp outside the class does not burden me.

3.0 Results and Discussion

3.1 Average Cluster Score

The average scores of students' responses based on the five clusters surveyed are shown in Figure 3. Overall, students responded positively to this learning activity. Participation cluster obtained the highest average score of 4.46, followed by Learning (4.16), Past Experience (4.14) Attraction (3.99), Implementation (3.96) while Emotion cluster has the lowest average score of 3.88. As could be seen in Figure 3, all clusters have a relatively high scores with none of the clusters scored below the average of three. These positive results suggest a beneficial use of SGD using WhatsApp as a learning and evaluation tool for undergraduate nutrition and dietetics students.

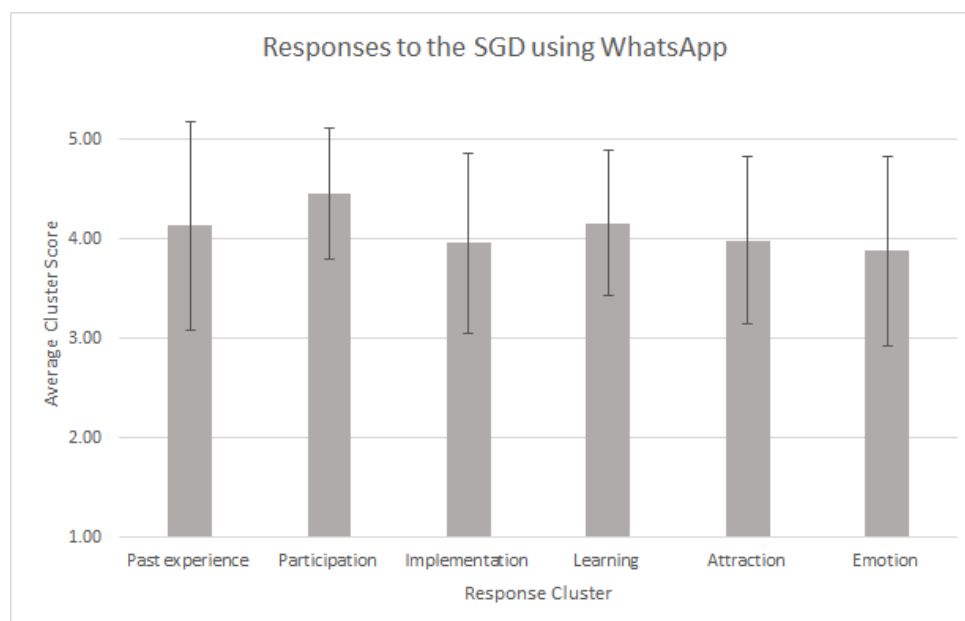


Figure 3: Average cluster score to the SGD using WhatsApp.

3.2 Detail Score of Each Cluster

Table 2 shows the detail average score for each item of each cluster. For item PE2 of Past Experience cluster, most students agreed and strongly agreed (91.30%, n=42) that undergoing this task of conducting a small group discussion using WhatsApp was their first encounter in their current undergraduate studies although they are native users of the smartphone application.

The result also indicated that WhatsApp is not a popular method for conducting a small group discussion as a course task in the studied university although students might have used WhatsApp as a means to conduct SGD for other purposes as indicated by item PE1 (65.22%, n=30). All items in Participation cluster (P1-3) have more than 86% of students rated 4 and 5 on all the surveyed statements. This implies that the use of WhatsApp as a discussion platform has encouraged maximum students' engagement in the task leading to better ability to share information and personal experience related to the topic.

In contrast to the high percentage of responding scores 4 and 5 of the above cluster, for Implementation cluster, students' responses on the suggestion to implement SGD using WhatsApp in other undergraduate courses (item I2) were divided between highly supporting this suggestion by rating 4 and 5 to the item (43.48%, n=20) and being neutral by rating the item as 3 (43.48%, n=20). However, more than half of the students agreed and strongly agreed on item I1 for SGD using WhatsApp to be implemented throughout this studied course

(65.22%, n=30). This points out that SGD using WhatsApp is favoured by students depending on the nature of the course they enrolled. The studied course has the learning objective to introduce the students to different cuisines and food habits of various ethnic groups hence a non-traditional way of conducting a small group discussion using WhatsApp is an interesting way of learning through exchanging ideas, information and experiences. Students might prefer other ways of learning for a more technical and challenging courses. In addition, students were happy with the way this task was being executed in terms of no instructor interference during the task, I3 (78.26%, n=36); suitable duration, I4 (80.43%, n=37) and number of students per group, I5 (91.30%, n=42).

Compared to the unlimited information provided by the internet, it is impossible for the instructors or lecturers to satisfy students' thirst for knowledge during limited class time (Yamamoto, 2016). As depicted by the results from Learning cluster, conducting SGD using WhatsApp has enabled students to learn and enhance their digital skills which is vital for their future career growth (Van Laar et al. 2019). Most students (80-95%) agreed and strongly agreed that this task has provided them the opportunity to read journal articles (L2) and do individually reading (L4), search for extra materials (L1) or information during the discussion (L3) which resulted in better understanding of the topic (L5). This task was rated as effective by 71.74% (n=33) of the students in gaining understanding of the given topic (L6).

Item A1 in Attraction cluster shows that by undergoing this task, students had time to do additional reading compared to traditional in-class group discussion (80.43%, n=37). Furthermore, students responded positively on item A4 that they could learn on the topic while chatting with their classmates through this task which was implemented using WhatsApp (91.30%, n=42). Other features of SGD using WhatsApp that received positive responses from students include the ease of highlighting themselves during discussion (A2), and the ability of WhatsApp platform to increase their curiosity in learning about the topic (A3).

For Emotion cluster, SGD using WhatsApp has attracted students to take part (E1) and learn about the topic (E2) as 89.13% (n=41) and 80.43% (n=37) responded agree and strongly agree to these two items. More than half of the students prefer for this task to be part of learning method (E3, 69.57%, n=32) and course assessment (E4, 58.70%, n=27). On the other hand, one-third of the students were being neutral by rating score 3 on these two items (E3, 28.26%; E4, 34.78%). Similarly, more than 50% of the students agreed and strongly agreed that they would be less confident in the traditional way of conducting small group discussion in classroom (E5) while the non-traditional way of conducting the task using

WhatsApp did not burden them (E6). Students might have different views and individual preferences in the idea of incorporating SGD using WhatsApp as a course assessment, however, for instructors, integrating this as part of course assessment will allow students to take the task more seriously and enhance their participation. Moreover, assessment on individual participation and discussion content is feasible and easy due to the features of WhatsApp group which enable every member of the group to monitor the conversation carried out in the group.

3.3 Intra- and Inter-cluster Score Correlations

Further, bivariate Spearman correlation test was performed to identify significant, strong positive correlations among statement scores within and between clusters (Table 3). Correlation coefficient values, r larger than 0.7 were considered as strong correlations in this study as recommended by Dancey and Reidy (2007).

No strong positive correlations were found either inter- or intra-cluster for Past Experience and Attraction clusters. For Participation cluster, a strong positive correlation was present between empowerment to share information from individual reading (P2) with the opportunity to look for additional materials regarding topics (L1) from the Learning cluster ($r=0.712$, $p<0.01$). The promotion of information seeking and sharing by the students when WhatsApp is being used to conduct SGD could enhance students' academic performance as suggested by Mills, Knezek and Khaddage (2014) who stated that information seeking, information sharing, and access to mobile technologies are important complimentary components in the move along the formal to casual learning continuum leading to improved achievement.

For Implementation cluster, both inter- and intra-cluster correlations were found. A strong positive correlation was observed between the recommendation to execute SGD using WhatsApp throughout this studied course (I1) with the recommendation to implement it in other undergraduate courses (I2) ($r=0.756$, $p<0.01$). In addition, the recommendation to execute SGD using WhatsApp throughout this studied course (I1) also had a strong positive correlation with students' preferences for SGD using WhatsApp to be incorporated as part of course assessment (E4) ($r=0.767$, $p<0.01$). Furthermore, the recommendation to implement SGD using WhatsApp in other undergraduate courses (I2) was also found to have a strong positive correlation with students' preferences for it to be incorporated as part of course assessment (E4) ($r=0.835$, $p<0.01$) and the fact that it did not impose any burden to students when conducted outside the classroom (E6) ($r=0.738$, $p<0.01$). In other words, students welcomed the use of a text messaging application for conducting an online learning and assessment.

This is due to the flexibility that SGD using WhatsApp offers to the students as opposed to the traditional way of having to be present in the classroom for teaching and learning activities to be conducted.

Apart from the aforementioned intra-cluster correlation between L1 and P2, a strong positive inter-cluster correlation was also observed in the Learning cluster between increased comprehension on the topic (L5) and the effectiveness of online platform used for this learning activity (L6) ($r= 0.791$, $p<0.01$). Students have different ways of learning and some students are not able to handle the pressure in the traditional classroom setup. When using online platform for learning, students can have interactions with classmates in a more relaxed, less pressured environment where they can take their own time exploring ways to achieve individual comprehension on the topic discussed through extra reading and information seeking and sharing without having to compete with others. Reddy, Menon and Thattil (2018) revealed that academic stress is still an overwhelming issue affecting students' psychological well-being. The 'blended learning' approach through the introduction of SGD using WhatsApp might be able to reduce the high academic stress experienced by students.

Lastly, for the Emotion cluster, in addition to inter-cluster correlation between I1 and E4, I2 and E4, and I2 and E6 mentioned above, an intra-cluster correlation was also observed between students' preferences for SGD using WhatsApp to be incorporated as part of course assessment (E4) and the fact that it does impose any burden to students when conducted outside the classroom (E6) ($r= 0.706$, $p<0.01$). The fact that students perceived this innovation as not burdening them and preferred it to be included as part of course assessment allows instructors to anticipate that SGD using WhatsApp would be an effective way for students to enjoy learning on a particular topic.

Table 2: *Detail average score for each item of each cluster.*

Cluster	Item Code	Item score Mean ± SD	Total item responses of scores 1 (strongly disagree) and 2 (disagree)	Total item responses of score 3 (neutral)	Total item responses of scores 4 (agree) and 5 (strongly agree)	Cluster score Mean ± SD
Past experience (PE)	PE1	3.87±1.22	9(19.57)	7(15.22)	30(65.22)	4.14±1.05
	PE2	4.41±0.78	2(4.35)	2(4.35)	42(91.30)	
Participation (P)	P1	4.24±0.74	1(2.17)	5(10.87)	40(86.96)	4.46±0.62
	P2	4.52±0.55	0(0.00)	1(2.17)	45(97.83)	
	P3	4.63±0.49	0(0.00)	0(0.00)	46(100.00)	
Implementation (I)	I1	3.83±0.82	2(4.35)	14(30.43)	30(65.22)	3.96±0.90
	I2	3.48±1.07	6(13.04)	20(43.48)	20(43.48)	
	I3	3.98±0.80	1(2.17)	9(19.57)	36(78.26)	
	I4	4.09±0.86	3(6.52)	6(13.04)	37(80.43)	
	I5	4.43±0.65	0(0.00)	4(8.70)	42(91.30)	
Learning (L)	L1	4.33±0.63	0(0.00)	4(8.70)	42(91.30)	4.16±0.73
	L2	4.07±0.74	1(2.17)	8(17.39)	37(80.43)	
	L3	4.28±0.78	2(4.35)	3(6.52)	41(89.13)	
	L4	4.33±0.63	1(2.17)	1(2.17)	44(95.65)	
	L5	4.04±0.70	1(2.17)	7(15.22)	38(82.61)	
	L6	3.89±0.82	1(2.17)	12(26.09)	33(71.74)	
Attraction (A)	A1	4.11±0.88	3(6.52)	6(13.04)	37(80.43)	3.99±0.85
	A2	3.59±0.98	7(15.22)	11(23.91)	28(60.87)	
	A3	4.02±0.71	0(0.00)	11(23.91)	35(76.09)	
	A4	4.24±0.67	1(2.17)	3(6.52)	42(91.30)	
Emotion (E)	E1	4.35±0.79	2(4.35)	3(6.52)	41(89.13)	3.88±0.95
	E2	4.00±0.70	1(2.17)	8(17.39)	37(80.43)	
	E3	3.98±0.83	1(2.17)	13(28.26)	32(69.57)	
	E4	3.76±1.04	3(6.52)	16(34.78)	27(58.70)	
	E5	3.48±1.03	9(19.57)	12(26.09)	25(54.35)	

E6	3.72±1.07	6(13.04)	13(28.26)	27(58.70)
----	-----------	----------	-----------	-----------

Table 3: Selected intra- and inter-cluster score correlations.

Survey Item Code	P2		I1		I2		L1		L5		L6		E4		E6	
	r	p value	r	p value	r	p value	r	p value	r	p value	r	p value	r	p value	r	p value
P2	1.000	N/A	0.382**	0.009	0.225	0.133	0.712**	0.000	0.232	0.121	0.373*	0.011	0.218	0.145	0.328*	0.026
I1	0.382**	0.009	1.000	N/A	0.756**	0.000	0.322*	0.029	0.578**	0.000	0.559**	0.000	0.767**	0.000	0.622**	0.000
I2	0.225	0.133	0.756**	0.000	1.000	N/A	0.279	0.060	0.504**	0.000	0.583**	0.000	0.835**	0.000	0.738**	0.000
L1	0.712**	0.000	0.322*	0.029	0.279	0.060	1.000	N/A	0.321*	0.030	0.410**	0.005	0.356*	0.015	0.330*	0.025
L5	0.232	0.121	0.578**	0.000	0.504**	0.000	0.321*	0.030	1.000	N/A	0.791**	0.000	0.541**	0.000	0.509**	0.000
L6	0.373*	0.011	0.559**	0.000	0.583**	0.000	0.410**	0.005	0.791**	0.000	1.000	N/A	0.617**	0.000	0.645**	0.000
E4	0.218	0.145	0.767**	0.000	0.835**	0.000	0.356*	0.015	0.541**	0.000	0.617**	0.000	1.000	N/A	0.706**	0.000
E6	0.328*	0.026	0.622**	0.000	0.738**	0.000	0.330*	0.025	0.509**	0.000	0.645**	0.000	0.706**	0.000	1.000	N/A

Analysed using Spearman correlation test

N/A: Not applicable

* significant at $p < 0.05$

** significant at $p < 0.01$

4.0 CONCLUSION

In conclusion, SGD using WhatsApp could be used as a better alternative to in-class group discussion among undergraduate students as it increases students' participation, let students discuss, search for information and share them at their own pace and convenience, compared to traditional in-class discussion group which students often take part without proper preparation, thus decreasing their participation in the discussion.

SGD using WhatsApp could also serve as an evaluation tool for university courses especially those involve with the learning of different cultures, religions and life backgrounds. It allows instructors to better monitor students on their individual participation and discussion content for evaluation purpose. For nutrition and dietetics students worldwide, the application of SGD using WhatsApp will enable them to engage in more diverse cultural experiences which will widen their horizon on different foods and cultures. This innovation study is very relevant to Education 4.0 learning trends, in which learning can take place anytime anywhere with the use of technology.

5.0 ACKNOWLEDGEMENTS

The authors would like to thank all the students for their participation in this innovation study.

6.0 REFERENCES

- Annamalai, N. (2018). How do we know what is happening in WhatsApp: A case study investigating pre-service teachers' online activity, *Malaysian Journal of Learning and Instruction*, 15(2), 207-225.
- Appiah, M. K. (2016). Influence of WhatsApp on study habit of university students in Ghana. *International Journal of Research in Economics and Social Sciences*, 6(3), 280-292.
- Burrowes, J. D. (2004). Incorporating ethnic and cultural food preferences in the renal diet. *Advances in Renal Replacement Therapy*, 11(1), 97-104.
- Curran, V. R., Sharpe, D., Forristall, J., & Flynn, K. (2008). Student satisfaction and perceptions of small group process in case-based interprofessional learning. *Medical Teacher*, 30(4), 431-433.
- Dancey, C. P., & Reidy, J. (2007). *Statistics without Maths for Psychology*. Pearson Education.

- de Jong, Z., van Nies, J. A., Peters, S. W., Vink, S., Dekker, F. W., & Scherpbier, A. (2010). Interactive seminars or small group tutorials in preclinical medical education: results of a randomized controlled trial. *BMC Medical Education*, 10(1), 79.
- Ferreri, S. P., & O'Connor, S. K. (2013). Redesign of a large lecture course into a small-group learning course. *American Journal of Pharmaceutical Education*, 77(1), 13.
- Hootsuite & We Are Social. (2020), *Digital 2020: Malaysia*. Retrieved April 20, 2020, from <https://datareportal.com/reports/digital-2020-malaysia>.
- Johnston, M. J., King, D., Arora, S., Behar, N., Athanasiou, T., Sevdalis, N., & Darzi, A. (2015). Smartphones let surgeons know WhatsApp: An analysis of communication in emergency surgical teams. *The American Journal of Surgery*, 209(1), 45-51.
- Mills, L. A., Knezek, G., & Khaddage, F. (2014). Information seeking, information sharing, and going mobile: Three bridges to informal learning. *Computers in Human Behavior*, 32, 324-334.
- Montag, C., Błaszczewicz, K., Sariyska, R., Lachmann, B., Andone, I., Trendafilov, B., Eibes, M. & Markowitz, A. (2015). Smartphone usage in the 21st century: Who is active on WhatsApp? *BMC Research Notes*, 8(1), 331.
- Reddy, K. J., Menon, K. R., & Thattil, A. (2018). Academic stress and its sources among University students. *Biomedical and Pharmacology Journal*, 11(1), 531-537.
- Rosenberg, H., & Asterhan, C. S. (2018). "WhatsApp, Teacher?"-Student perspectives on teacher-student WhatsApp interactions in secondary schools. *Journal of Information Technology Education: Research*, 17, 205-226.
- Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2019). The sequential and conditional nature of 21st-century digital skills. *International Journal of Communication*, 13, 26.
- Yamamoto, N. (2016). *Improvement of group discussion system for active learning using smartphone*. In 2016 10th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS) (pp. 143-148). IEEE.