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Evaluating the Effectiveness of One Health Training Programmes among Medical, Veterinary, Ecology, and Allied Health Students

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Abstract

Medical and veterinary students are not exposed to One Health approach to managing infectious diseases in the traditional university curriculum. To increase their knowledge and capacity on One Health, the Malaysian One Health University Network (MyOHUN) has been developing One Health training programmes for medical, veterinary, ecosystem and health allied students. However, the effectiveness of the One Health training programmes is unknown. This study aims to evaluate the effectiveness of MyOHUN One Health training programmes by assessing students' reaction, learning, and behaviour levels of the Kirkpatrick training evaluation model. A quantitative survey was conducted, and the results showed that MyOHUN training programmes positively encourage the respondents to understand and appreciate one health. Participants enjoyed the training programmes, learned about One Health, and applied the learnings from the training programmes into their current practices. MyOHUN may use the findings to evaluate further the effectiveness of other MyOHUN training programmes conducted in the same or different areas and encourage universities to integrate One Health activities in their curriculum using MyOHUN activities as a case study.

Keywords: Training Effectiveness, One Health Programmes, Kirkpatrick, Malaysia One Health University Network (MyOHUN), Training Evaluation.

Introduction

According to the U.S Centers for Disease Control and Prevention and the One Health Commission, One Health is a transdisciplinary, multisectoral, and collaborative approach at local, regional, national, and global levels to obtain optimal health outcomes recognising the interconnection between people, animals, plants, and their shared environment (Mackenzie & Jeggo, 2019). One Health approach encourages cooperation and collaboration amongst

academicians, professionals, scientists, and communities from many sectors and disciplines responsible for the health of humans, domestic animals, wildlife, and the environment. Zoonotic agents, one of the public health issues recognised by One Health, requires multi-actions and expertise from public health, animal health, plant health, and the environment disciplines (Buschhardt et al., 2021). Medical, veterinary, ecosystem and allied health students are also responsible for the health of humans, animals, and the environment since they are the future workforce and leaders. Therefore, it is essential to improve their knowledge, skills, and attitudes towards One Health through training (Vicente et al., 2021).

Training is one of the factors supporting successful One Health collaborations (Errecaborde et al., 2019). Early exposure of One Health training will better prepare medical students to consider a more holistic approach to arriving at a diagnosis, communicate health issues with their patients and examine the impact of animal and environmental health factors on patient health (Chapman & Animasahun, 2018; Roopnarine et al., 2021). For veterinary students, One Health training improves their understanding of their role and responsibilities in society, benefits and risks associated with human-animal interactions, and the contributions of various professionals in protecting the animal, humans, and environmental health and welfare (Mor et al., 2018). Apart from medical and veterinary students, One Health training emphasises the importance of ecosystem and allied health students' involvement in One Health since the approach requires the understanding and appreciation of various disciplines. A multidisciplinary approach of One Health training allows students from various universities to connect and develop critical thinking and hone their skills (Rashid & Lau, 2020).

Traditional university teachings have not exposed students to a systematic way of tackling complex problems using an integrated One Health approach (Rashid & Lau, 2020). The rudimentary interdisciplinary learning happens due to lack of time, funding, competing priorities, lack of proximity of students, and discordant academic schedules (Wilkes et al., 2019). Owing to this situation, medical and veterinary students lacked knowledge in One Health. Franco-Martínez et al (2020) reported that 80 per cent of the medical and veterinary students have poor knowledge about One Health and a 71% failed to incorporate the main concepts of One Health before they were exposed to any One Health activities. According to previous studies, some of the gaps include under-appreciation of the importance of considering zoonotic diseases on the differential diagnostic list in human negative health situations, the lack of communication between human and animal health stakeholders, underestimation of the importance of environmental health, and the lack of understanding of the role of human behaviour in animal disease outbreaks (Courtenay et al., 2014; Damborg et al., 2016; Marcotty et al., 2013; Franco-Martínez et al., 2020). Indeed, there have been calls for medical, veterinary, ecosystem and allied health students' training in One Health to prepare them for the future workforce.

As part of a more significant effort to increase knowledge and capacity of One Health approach in managing diseases, the Malaysian One Health University Network (MyOHUN) has been actively developing specific training programmes for medical, veterinary, ecosystem and health allied students with the major aim of inculcating the one health competencies amongst students from these areas. However, the effectiveness of the MyOHUN One Health training programmes conducted among the students has not been assessed. The effectiveness of training programmes is determined by how well the training programmes promote learning and how well they transfer the learning through job implementation (Na-Nan et al., 2017). To ensure training effectiveness, conducting a training evaluation is necessary (Bramley & Kitson, 1994).

This study aims to evaluate the effectiveness of MyOHUN One Health training programmes among medical, veterinary, ecosystem and allied health students by conceptualising the four levels of the Kirkpatrick training evaluation model. This study only focuses on the first three levels of Kirkpatrick evaluation which are the reaction (level 1), learning (level 2), and behaviour (level 3) levels. Organisations prefer to evaluate the first three levels because more data, resources, and time exhaustive were found at level 4 (Blanchard et al., 2000). To the best of the author's knowledge, this research is the first to provide a comprehensive evaluation of five One Health programmes among university students in Malaysia using the Kirkpatrick evaluation model.

Literature Review

Training Effectiveness

Training effectiveness describes the extent to which a training program generates the desired outcomes (Sitzmann & Weinhardt, 2015). Training effectiveness results in knowledge transmission, and training is considered successful when a trainee's performance on a subject improves as a result of completing the program (Ahmed & Fariduddin, 2005). The outcome of training effectiveness includes trainee reaction, learning outcomes, increased motivation, transfer of knowledge and skills to the workplace, training's return on investment (ROI), and training's impact on organisational performance (Sitzmann and Weinhardt, 2015). Training evaluation is required to determine the effectiveness of the training. The evaluations can determine whether the training investment has been returned and if the training requires further improvements (Pineda-Herrero et al., 2011). To measure training effectiveness, the Kirkpatrick training evaluation model is applied.

Kirkpatrick's Training Evaluation Model

Kirkpatrick evaluation is the most commonly used model to measure the effectiveness of training programmes (EL Hajjar and Alkhanaizi, 2018). The evaluation is used primarily in medical training, followed by computer science, business, and social sciences (Alsalamah and Callinan, 2021). Kirkpatrick's training evaluation model is hierarchical as the evaluation proceeds gradually based on the information received at each level. The four levels of Kirkpatrick training evaluation consist of reaction, learning, behaviour, and result. Reaction (level 1) evaluates how relevant, enjoyable, engaging, and motivating MyOHUN One Health training programmes are to the students. A successful training program is indicated by the trainees' enjoyment of the program and eagerness to learn (Dewi and Kartowagiran, 2018). Learning (level 2) assesses the extent to which MyOHUN One Health training programmes improve knowledge, change attitude, enhance skills, and increase confidence and commitment of the students to a certain task. Behaviour (level 3) assesses how MyOHUN One Health training programmes change students' attitudes in the post-training near future. This level focuses on the extent to which students apply the learnings obtained from the training programmes into their current practices. Result (level 4) evaluates the result of MyOHUN One Health training programmes in organisational outcomes such as increased production, cost reduction and quality improvement.

Methodology

MyOHUN One Health Training Program

MyOHUN is a national network dedicated to promoting One Health via collaborative efforts to combat new and emerging diseases in Malaysia. MyOHUN aims to be a social and

intellectual network by linking universities, government, and relevant agencies to generate social and intellectual capital on infectious and zoonotic diseases of national and global concern. Since 2013, MyOHUN has created several One Health training programmes such as Community Education in Belum Reserve, In-Situ Problem-based Learning, One Health Young Leader, Table Top Simulation, and Wildlife Zoonoses and Ecosystem Health.

This study selected these training as they have been conducted for multiple years. Community Education in Belum Reserve training trains students who were assigned as facilitators under lecturers' supervision to educate Orang Asli about knowledge and awareness of identification, transmission, and control of Zoonotic diseases while improving students' awareness on refined communication skills and cultural sensitivities. In-Situ Problem-based Learning training stimulates students to work across disciplines while learning about the concept of ecosystem health, its role in the prevention of zoonotic pathogen transmission from wild animals, how to identify ecosystem degradation, and its relation to zoonoses using veterinary problem investigations and disease management cases. One Health Young Leader training develops students' skills in communication, leadership, and partnership across disciplines to prepare students to be the future One Health workforce to detect, prevent, and respond to emerging diseases using interactive lectures, group work, games, role-play, and team building. Table Top Simulation training educates students about One Health core and technical competencies to detect, prevent, and respond to outbreaks using possible scenarios, preparedness plans, and One Health manual on outbreak control through concept lecturers, case studies-based activities, and farm tours. Wildlife Zoonoses and Ecosystem Health training enhance students' understanding on the basics of ecology, ecosystem health and its degradation risks, the relationship between ecosystem health and wildlife, zoonoses-related issues, risk analysis, outbreak management, and biosecurity matters through lecturers, active discussion, and field simulations. The goal of the five selected MyOHUN One Health programmes was to prepare students to respond, prevent, and fight infectious disease outbreaks in the future.

Instrument Development Process

Items used in this study were constructed based on the adaptation of past literature items and the inclusion of specific content and essence delivered in each MyOHUN One Health training program. Items used in this study also included the elements of reaction, learning, and behaviour according to the guidelines of the Kirkpatrick training evaluation model (Kirkpatrick, 1996). The researcher ensured items were worded using simple and direct language and presented logically or adaptively to ease respondents' comprehension. An example of a reaction item is *"I was satisfied with the overall program"* (McLean and Moss, 2003). An example of learning item is *"I have gained better understanding about global health issues"* (McLean and Moss, 2003). An example of a behaviour item is *"I have applied the One Health concept to my working environment"* (Grohmann et al., 2013).

The items' content was validated with the help of the activity's designer, which includes the project leaders and the officers from the National Coordinating Office of MyOHUN. Items' reliabilities were also tested in the pilot study. A 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), which indicates the level of improvement in reaction, learning, and behaviour, was used as it would lower the frustration level of respondents while increasing their response rate and response quality (Sachdev & Verma, 2004). The survey directive explicitly stated that students' responses would reflect their reaction, learning, and behaviour gained from the training programmes. The web-based survey, using Google Form, was used because face to face interaction was minimised due to the ongoing Covid 19

pandemic at the time of the study. In addition, this platform reduces time, saves cost, and minimises the error of data entry (Solomon, 2000). A survey questionnaire is useful for getting direct feedback from respondents on their encounters, experiences, and perspectives on a topic (Basar et al., 2021).

The pilot study was carried out prior to the execution of the study to determine the survey reliability and validity, the time required to complete the surveys, and common interpretation and understanding of the questions asked in the surveys by the target population. One of the advantages on doing a pilot study is to give advance warning about where the main research project could fail (van Teijlingen & Hundley, 2001). The pilot study was then conducted on 67 students consisting of 12 to 14 respondents from each selected training program. Once the pilot study was conducted, the questionnaire was improved, and the full study was executed.

Results from the Pilot Study

An identical range of respondents to be included in the pilot study was suggested for survey research (Hill, 1998). Reliability analysis was carried out and compared before and after the pilot study. The reliability test assesses the stability or consistency of respondents or the tendency to stay the same over time (Bolarinwa, 2015). The decisions to delete, add or maintain items for the pilot study were not only based on the alpha values but also judgements of whether the items were necessary for the outcome measurement. The Cronbach's alpha value before the pilot study ranged from 0.52 to 0.97. After the pilot study, 76 items were removed, and the alpha value was increased between 0.81 to 0.95; this range considers good reliability between 0.80 to 0.95 (Zikmund et al., 2013). Table 1 compares the reliability value (based on Cronbach's alpha value) before the pilot study and after the pilot study (after some items with low alpha values were removed).

Table 1

Reliability Values Before and After Pilot Study

Training Program	Level	No. of Items Before Pilot Study	of Cronbach's Alpha Value Before Pilot Study	No. of Items After Pilot Study	Cronbach's Alpha Value After Pilot Study
Community Education in Belum Reserve (n=14)	Reaction	10	0.52	7	0.81
	Learning	14	0.86	11	0.84
	Behaviour	14	0.94	15	0.95
In-Situ Problem-based Learning (n=13)	Reaction	10	0.85	8	0.88
	Learning	11	0.93	11	0.93
	Behaviour	14	0.95	10	0.93
One Health Young Leader (n=14)	Reaction	19	0.95	12	0.95
	Learning	25	0.97	11	0.95
	Behaviour	29	0.93	13	0.94
Table Top Simulation (n=14)	Reaction	9	0.87	8	0.94
	Learning	12	0.93	10	0.94
	Behaviour	25	0.97	13	0.94
Wildlife Zoonoses and Ecosystem Health (n=12)	Reaction	12	0.88	9	0.93
	Learning	16	0.94	13	0.95
	Behaviour	16	0.97	9	0.94

Population and Sample Size

The total population of this study is 1,333 participants who were active students when attending the MyOHUN One Health training programmes. The participants were medical, veterinary, ecosystem, and allied health students (biomedical science, environmental health, ecology, forestry, public health, and medicine) from Secondary School, Diploma, Bachelor, Master, and PhD level. The population sizes on each MyOHUN One Health training programmes varies. The population number is calculated based on a list of participants provided by MyOHUN. This research has also gained permission from the Ethics Committee for Research Involving Human Subjects. Respondents were ensured of confidentiality and were informed that they have the right to withdraw from the study at any time without prejudice.

The improved closed-ended surveys after the pilot study were then distributed to 1,333 participants of MyOHUN training program. The survey was conducted via online, and the

google link were sent via email. As many as 236 participants (20.03%) were responded to the online survey. Table 2 shows the number of populations on each training program and its response rate to the survey.

Table 2

Population and in MyOHUN One Health Training Programmes

Training Programmes	Population Size	Respondents	Response Rate
Community Education in Belum Reserve	154	61	37.89%
In-Situ Problem-based Learning	606	93	15.35%
One Health Young Leader	207	33	15.94%
Table Top Simulation	168	41	24.40%
Wildlife Zoonoses and Ecosystem Health	198	39	19.70%
Total Population	1,333	236	20.03%

Data Analysis

The normality of data distribution was analysed using Exploratory Data Analysis (EDA) and the mean effectiveness of MyOHUN One Health training programmes was analysed using One Sample t-Test in IBM SPSS version 24. In this study, the hypothesised or test value of one sample T-Test is 1, which represents the starting point and lowest point of the 5-point Likert scale for the measured variables that indicate zero improvements on reaction, learning, and behaviour. Students were expected to answer 1 if there was no change in reaction, learning, and/or behaviour. Since the survey explicitly stated that students' responses reflect the reaction, learning, and behaviour gained from the training programmes, the researchers assumed that students read and understood the instructions for each item in the survey. The null and alternative hypotheses are $H_0: \mu = 1$ and $H_1: \mu \neq 1$, respectively.

Results and Discussion

Demographically, most of the respondents were between 21 and 27 years old (74%) and were mainly females (68%). The majority of them are Malay (70%), Malaysian-Chinese (16%), Malaysian-Indian (6%) and others (9%). A very small portion were from Yemen, Nigeria, Cambodia, Thailand, Iran and Bangladesh. Respondents were undergoing Bachelor's (73%), Master's (16%) and PhD (6%) programmes. Geographically, the central region of Peninsular Malaysia (52%) dominates, while a lesser proportion of respondents reside in Sabah (3%), Sarawak (3%), and others (overseas) (3%). Most of the respondents were studying human health (45%) and animal health (38%) areas. Exploratory data analysis revealed that data were normally distributed with skewness values between -1.333 to -.989 and kurtosis values between -.293 to 2.209. Acceptable values of skewness fall between -3 and +3, and kurtosis is appropriate from a range of -10 to +10 (Brown, 2006).

Overall Findings

Table 3 shows the results of the One Sample t-Test for reaction, learning, and behaviour means from all the MyOHUN One Health training programmes. The results show that the p-values of reaction, learning, and behaviour were below 0.05, indicating the sample mean of reaction, learning, and behaviour of each training program was significantly different from the hypothesised value of this study. In other words, it can be concluded that the training programmes provided by MyOHUN were significantly effective in participants' reaction,

learning, and behaviour. The positive value of the mean difference indicates the mean height of reaction, learning, and behaviour is greater than the hypothesised value. Fig. 1 shows the mean value of reaction, learning, and behaviour for each MyOHUN training program.

Table 3

One Sample t-Test for Reaction, Learning and Behaviour (n=267) for MyOHUN Training Programmes

Training Programmes	Test value=1								
	Reaction			Learning			Behaviour		
	t	p	Mean Difference	t	p	Mean Difference	t	p	Mean Difference
Community Education in Belum Reserve	78.91	.00	3.62	48.19	.00	3.39	39.18	.00	3.19
In-situ Problem-based Learning	56.92	.00	3.45	51.44	.00	3.30	36.89	.00	2.82
One Health Young Leader	43.82	.00	3.56	35.12	.00	3.34	29.92	.00	3.05
Table Top Simulation	55.21	.00	3.64	46.59	.00	3.50	35.81	.00	3.28
Wildlife Zoonoses and Ecosystem Health	49.99	.00	3.64	38.27	.00	3.50	28.19	.00	3.23

In general, the selected five MyOHUN training programmes were effective at three different levels: reaction, learning, and behaviour. If the effectiveness level were divided into three classes, low (1.00-2.32), medium (2.33-3.66), and high (3.67-5.00), all training programmes hit the high level of effectiveness. However, In-situ Problem based Learning training program received relatively low effectiveness at all levels, and it did not change significant participants' behaviour after the training. This training was one of the most multidisciplinary since some MyOHUN programmes were focused on medicine and veterinary science. In-situ problem-based Learning program also has the biggest participants, with a total population of 606 people, while the other training programmes only covered 150 to 210 people. Large training participants lead to students' dissatisfaction in the previous research; students have less interaction with their trainers, often get distracted with noise, and do not get opportunity to approach the trainers for help (Fortes and Tchantchane, 2010). In addition, only class lecturers and no site visits or field trips were conducted in In-situ problem-based learning training. Further, field trips give students experiential learning that gets students out of the traditional classroom and have a more positive attitude toward the subject (Behrendt & Franklin, 2014; Ramachandiran & Dhanapal, 2016).

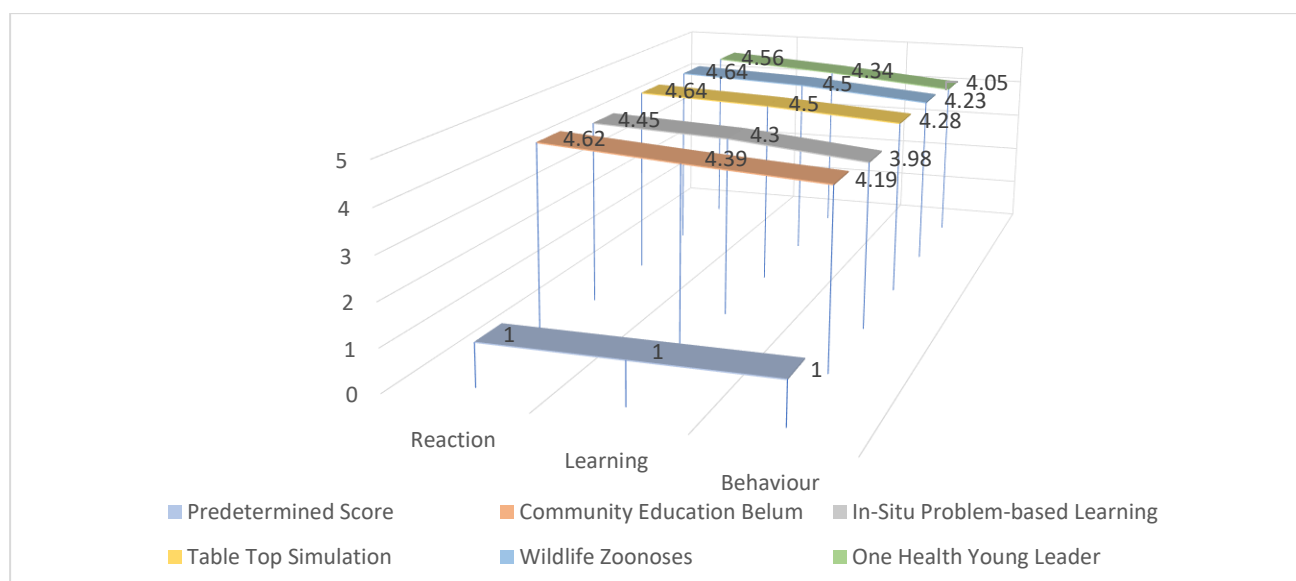


Figure 1. Mean value of reaction, learning, behaviour, and predetermined score

Level 1 – Reaction

Reaction is located in the first phase of Kirkpatrick's training evaluation model, which assesses whether participants like the training and how they feel about it. In general, reaction (4.582) received the highest average from the overall training compared to other levels, such as learning (4.406) and behaviour (4.146). This means participants were enjoyed and engaged with the training programmes. Respondents feel high effectiveness at the Table Top Simulation (4.64) and Wildlife Zoonoses & Ecosystem Health (4.64) and had relatively low satisfaction at In-situ problem-based learning (4.45). As Community Education Belum, Table Top Simulation and Wildlife Zoonoses and Ecosystem Health involved class lecturers and a field trip to rural communities and indigenous people, all students (100%) who attended the training believed that the training could connect them with multiple disciplines, continuous networking, increased their cultural sensitivity in zoonotic disease, and enhance their knowledge about one health.

The Table Top Simulation and Wildlife Zoonosis and Ecosystem Health training programmes were the most favourable as perceived by the respondents and have significantly increased students learning about One Health. High reaction level perceived by the students might occur because the simulation aspect provided in both trainings provide the 'by doing' learning experiences which have been reported to enable deeper student engagements and promotes lifelong learning (Chernikova et al., 2020) in addition to being fun and enjoyable (Shellman and Turan, 2006). The utilisation of simulation in training programmes facilitated more impactful learning as it enable participants' appreciation and application of the learnings (Takayesu et al., 2006; Kaplan and Ura, 2010; Lestander et al., 2016). Simulation-based learning reconcile theory with practice enabling the acquisition of knowledge, build confidence, self-efficacy, and satisfaction (Cant and Cooper, 2017) and allows the acquisition of clinical skills which is vital in the training of interdisciplinary teams (Al-Elq, 2010; Hegland et al., 2017).

In the contrary, the In-situ Problem based Learning had the lowest effectiveness level compared to other training programmes. The training that focuses on One Health core values such as management, systems thinking, and soft skills have lower effectiveness level. As many as 10.9% respondents did not think the training improved their problem-solving skills, and

9.8% and 13.1% did not think the training program could connect them with multiple disciplines and continuous networking, respectively. However, almost all respondents from all training programmes would recommend it to others. It is possible that the reaction was contributed by the level of maturity of the respondents as this programme targeted earlier year students compared to other programmes. Therefore, it is possible that these students have less background knowledge that may not have the necessary information to be fully engaged in the training activity. This situation may impact the student's level of motivation. Problem-based learning requires student preparation and motivation beforehand (Jones, 2006). Less motivation and preparation of students will likely lead to unfavourable reactions towards the training and an ineffective learning process. Although problem-based learning may often bring positive outcomes, it still has drawbacks. Experts in medical faculty reported several disadvantages of problem-based learning affecting students' learning process, and one of them was resulting in a gap in students' knowledge (Abdelkarim et al., 2018). Some reports have suggested that problem-based learning is ineffective in developing a systematic understanding of a subject, and this could potentially impact the student's ability to enjoy their learning (Edens, 2000; Murphy, 2004).

Level 2 - Learning

The mean of learning in each training program indicates that the MyOHUN One Health training programmes effectively enhanced students' knowledge, skills, and attitudes about One Health because of their participation. Most of the students in Community Education in Belum Reserve training declared that they understood zoonotic disease control and prevention better (96.8%). Most of the students in One Health Young Leaders training declared that they have an improved understanding of disease management following the training (94.2%), while most of students in Wildlife Zoonoses and Ecosystem Health training declared that they have learned that wildlife is able to transmit disease to humans (97.4%). Most of the students in Table Top Simulation training reported that they gained better knowledge about the approach of managing zoonotic disease outbreak (95.1%). Most of the students in In-Situ Problem-based reported that they understood the role of wild animals and environment in possible transmission of diseases (95.7%).

Respondents also reported good skills and attitudes about One Health because of the activities conducted in each MyOHUN One Health training program. The Table Top Simulation and Wildlife Zoonoses and Ecosystem Health again appear to be the most effective training programmes most likely because they helped students' experience' realistic disease scenarios that better allow for retaining of information and practise till one masters the actual procedures and skills (Lateef, 2010). In Community Education in Belum Reserve, students' role as facilitators for training activities with the community has effectively increased students' learning because facilitating encouraged the students to improve their personal understanding of the subject matter, became sensitive to others' feelings and culture, cultivate new behaviours, and increase problem-solving skills (Pourghaznein et al., 2015). Game-based learning, one of the activities conducted in One Health Young Leader, was found to be more effective than typical traditional teaching in improving students' learning effectiveness and attitudes (Yien et al., 2011).

Level 3- Behaviour

The mean difference for behaviour in each training program shows that the MyOHUN One Health training programmes effectively benefited students with applicable knowledge, skills,

and attitudes about One Health that facilitated change of their behaviour. Respondents reported transferring their learnings from the training into their current practice. Most of students in Community Education in Belum Reserve training reported that they have improved their communication skills (96.8%), whereas more than half of students in In-Situ Problem-based Learning training reported that they have shared with others the roles of wild animals and environment in possible transmission of diseases (79.4%). The majority of students in Table Top Simulation training have applied One Health competencies in disease intervention, control and in responding to outbreak (90.3%). Most of the students in Wildlife Zoonoses training have shared the knowledge on diseases of wildlife zoonoses (87.1%) with others and shared the issues on wildlife zoonoses with others (87.1%). Most of the students in One Health Young Leaders training managed to apply the ethics learned in making decisions (88.6%).

The mean difference for behaviour (Table 3) in each training program varies with a tendency to be lower than the mean difference for reaction and learning. This situation is not uncommon as not all training content and activities can be translated at workplace. Moreover behaviour change may take longer to happen due to various external factors such as complex and unsupportive environment and irrelevance of training to current working conditions. Behaviour change is seen as an external criteria which are likely to be influenced by factors other than learning (Alsalamah & Callinan, 2021). Even if trainees who were satisfied with the instructor and training curriculum, had a positive learning experience, and progresses in professional knowledge and skills, their knowledge and skills will not always or automatically translate into changes in their practise due to the complex reality of the working environment (Liao & Hsu, 2019).

Conclusion and Implication

This research aims to determine the level of effectiveness of five MyOHUN training programmes. Training evaluation is necessary to ensure the effectiveness of MyOHUN training. The One Health training programmes organised by MyOHUN among the medical, veterinary, and health allied students from 2015 to 2019 have positively impacted the participants learning experiences and improved their skills and behaviour. A substantial portion of the participants managed to apply what they had learned into their workplace practices. The findings of this study may be used as an example for MyOHUN to further evaluate the effectiveness of other training programmes and may motivate universities to develop and include One Health activities in their curriculum.

Future studies are encouraged to include the Result (Level 4) of the Kirkpatrick training evaluation to evaluate training effectiveness particularly at organisational level. Applying a combination of data collection methods is also recommended to increase response rate. Since this study relied solely on self-report from the students, pre and post-test evaluation is suggested for future researchers to examine the desired changes in the students. Employing mix-method approach will help researchers understand better about uncountable variables contributing training effectiveness as well.

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