

## MANCHESTER CLINICAL PLACEMENT INDEX (MCPI) AS CLINICAL LEARNING ENVIRONMENT ASSESSMENT TOOL: ADAPTATION INTO INDONESIAN LANGUAGE

Carolyn<sup>1</sup>, Arnold Lukito<sup>2</sup>, Audelia Kathleen Sulaiman<sup>1</sup>, Elisabeth Rukmini<sup>3\*</sup>

<sup>1</sup>Medical Education Unit, School of Medicine & Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta – INDONESIA

<sup>2</sup>Faculty of Psychology, Atma Jaya Catholic University of Indonesia, Jakarta – INDONESIA

<sup>3</sup>Liberal Arts, Sustainability & Entrepreneurship (LSE); Department of Civil Engineering, Universitas Pembangunan Jaya, Tangerang Selatan – INDONESIA

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### ABSTRACT

**Background:** Clinical Learning Environment (CLE) involves many active dynamics, perceptions construction, learners' experiences, and behavior while learning. It includes every human resource working and learning together, a health system, and communities. Standard assessment of CLE is essential to evaluate CLE. The Manchester Clinical Placement Index (MCPI) assesses the CLE based on Community of Practice Theory, emphasizing learning according to experience-based learning. Translation of the MCPI into the Indonesian language will be valuable to assess the CLE. This research intends to translate and adapt MCPI into the Indonesian language. Therefore, MCPI can be used to assess the CLE in Indonesian medical schools.

**Methods:** An expert panel translated the MCPI into the Indonesian language (I-MCPI), and a language learning center validated the translation. Participants who were final year students (N: 155) filled up the online I-MCPI after the informed consent. To assess the I-MCPI validity, we performed exploratory factor analysis (EFA) and item discrimination. To seek reliability, we utilized internal consistency reliability showing as the Cronbach's alpha coefficient.

**Results:** The factor analysis and item discrimination showed the I-MCPI's validity. We found two subscales similar to the original MCPI. Leadership, reception, people, facilities, and organization have similar correlation strength to Subscale Learning Environment (0.60-0.71). Instruction and observation have similar correlation strength to Subscale Training (0.86-0.89). Subscale feedback correlates less than 0.60 for both subscales; thus, we concluded that feedback went to the subscale Training as the original MCPI. Reliability of the I-MCPI showed an excellent internal consistency with Cronbach's alpha of 0.87.

**Conclusion:** I-MCPI is a valid and reliable tool to assess the CLE. Further research with broader cohorts of medical schools will be valuable for advancing medical education in Indonesia.

**Keywords:** clinical education, clinical learning environment, Manchester Clinical Placement Index (MCPI), adaptation, Indonesian MCPI

\*corresponding author, contact: elisabeth.rukmini@upj.ac.id

**ABSTRAK**

**Latar belakang:** Lingkungan belajar klinik (Clinical Learning Environment, CLE) mendeskripsikan dinamika, persepsi konstruksi bersama, pengalaman dan tingkah laku pembelajar dalam proses belajar secara fisik maupun virtual. CLE memiliki cakupan luas, termasuk hubungan kerja antar profesi, sistem kesehatan, dan komunitas. Penilaian standar dibutuhkan untuk mengevaluasi keadaan lingkungan pembelajaran klinik. Manchester Clinical Placement Index (MCPI) menilai CLE berdasarkan Community of Practice Theory (COP) yang fokus pada pembelajaran berbasis pengalaman. Adaptasi alat MCPI ke dalam bahasa Indonesia dapat menggambarkan CLE. Penelitian ini bertujuan untuk menerjemahkan dan mengadaptasi MCPI ke dalam Bahasa Indonesia. Diharapkan, hasil adaptasi ini berguna untuk menilai CLE pada fakultas-fakultas Kedokteran di Indonesia.

**Metode:** MCPI diterjemahkan ke dalam Bahasa Indonesia (I-MCPI) dan divalidasi oleh sebuah pusat pembelajaran bahasa. Partisipan dalam penelitian ini adalah 155 mahasiswa kedokteran tahun terakhir. Partisipan mengisi I-MCPI secara daring. Validitas I-MCPI dinilai dengan melakukan analisis faktor eksplorasi dan diskriminasi item. Reliabilitas dinilai dengan konsistensi internal yang ditunjukkan sebagai koefisien Cronbach's alpha.

**Hasil:** Analisis faktor dan diskriminasi item menunjukkan validitas I-MCPI. Kami menemukan dua subskala serupa dengan MCPI asli. Kepemimpinan, penerimaan, dukungan, fasilitas, dan organisasi memiliki kekuatan korelasi serupa dengan Subskala Lingkungan Belajar (0,60-0,71). Instruksi dan observasi memiliki kekuatan korelasi serupa dengan Subskala Pelatihan (0,86-0,89). Item umpan balik berkorelasi kurang dari 0,60 untuk kedua subskala; dengan demikian, kami menyimpulkan bahwa umpan balik dimasukkan dalam subskala Pelatihan seperti MCPI asli. Reliabilitas I-MCPI menunjukkan konsistensi internal yang sangat baik; Cronbach's alpha 0.87.

**Kesimpulan:** I-MCPI adalah alat yang valid dan reliabel untuk menilai CLE. Penelitian lebih lanjut dengan melibatkan fakultas-fakultas kedokteran yang lebih luas akan bermanfaat untuk memajukan pendidikan kedokteran di Indonesia.

**Kata kunci:** pendidikan klinik, lingkungan pembelajaran klinik, Manchester Clinical Placement Index (MCPI), adaptasi, MCPI Bahasa Indonesia

**PRACTICE POINTS**

- This study adapted MCPI into Indonesian-MCPI (I-MCPI) to improve the standard of the Clinical Learning Environment.
- Results showed the validity of I-MCPI through the factor analysis and item correlation. I-MCPI is a reliable tool with Cronbach's alpha of 0.87.
- Factor analysis and item correlation proved that I-MCPI is consistent with the original MCPI. I-MCPI has two subscales, which are Learning Environment Subscale and Training subscale.
- I-MCPI is a valid and reliable assessment to evaluate Clinical Learning Environment.

**INTRODUCTION**

Clinical Learning Environment (CLE) portrays medical students' dynamic, construction, perception, experiences, and behaviour, either physically or virtually, within the learning process.<sup>1,2</sup>

CLE is an important place to train future doctors and improve healthcare and the health system in real practice.<sup>1</sup> These reasons underlie further research of CLE, including its assessment toward medical education.

Every medical school has its CLE, tailored in accordance with the culture, customs, health system, and community.<sup>2</sup> Medical students and patients were in an environment naturally setting with its complicated situation.<sup>2,3</sup> Indonesian medical schools in a multicultural country consisted of more than 17.000 islands and 700 languages spread within 300 native ethnicities.<sup>4</sup> The rich cultural differences of 86 medical schools across Indonesia bring their diversity in CLE too. As a result, assessment toward CLE of each medical school in Indonesia has risk factors on multi perspectives. Most medical schools in Indonesia have several CLEs for their complete clinical rotation. Thus, CLE with different situations and backgrounds even happened in a medical school with various clinical rotations in several hospitals, clinics, and community centers.<sup>3</sup> Consequently, the assessment toward CLEs is very challenging. CLE standards across healthcare providers (hospitals, clinics, and community centers) and medical schools will be valuable for medical schools' leaders.

There has never been a tool recognized as a gold standard to evaluate the learning environment internationally. Researchers have tried to create several tools to evaluate the learning environment; two are Dundee Ready Educational Environment Measure (DREEM) and Manchester Clinical Placement Index (MCPI).<sup>5</sup> Medical educators have been using DREEM as a widely accepted and excellent tool to measure the learning environment regarding its ability to be used in the variable culture of different medical learning environment.<sup>5</sup> DREEM has been deemed able to correlate with academic performance measurement.<sup>6</sup> On the other hand, subsequent research shows that there were differences in the analyses and reports of DREEM users due to the absence of clear guidelines for using related tools.<sup>5</sup> In addition, psychometric evaluation has detected DREEM's internal inconsistencies and also discover that DREEM to be more relevant for the pre-clinical learning environment' assessment.<sup>5,6,7</sup>

### **Manchester Clinical Placement Index (MCPI)**

Efforts on researching CLE and finding the assessment toward CLE came to the design of MCPI. MCPI is a tool to evaluate the learning environment, particularly

in clinical settings of medical schools.<sup>8</sup> MCPI consists of eight questions set concerning leadership, acceptance/induction, community, instruction, observation, feedback, facility, and organization of clinical rotation placement. Each set of questions or statements utilize the Likert Scale (0-6) and two open-ended questions with a comment column. The theoretical framework of Community of Practice (COP) underlies the MCPI design. COP emphasizes students' active role in "learning" compared to the role of "being taught." This principle relies on experience-based learning (eXBL), which valued students' experiences in dealing with patients directly.<sup>3,8,9,10</sup>

The validation and reliability of MCPI as an assessment tool of CLE are available in its English edition.<sup>8</sup> The assessments, including pilot projects and implementation in real CLE for some medical schools, show good evidence. Among the lists are Ireland, United Kingdom, Hungary, South Africa, and Canada.<sup>8,11,12</sup> Although English has been an acclaimed international language and put as one of the requirements in Indonesian medical schools, there still are several words and sentences that could be ambiguous for Indonesian. The interpretation of some English words within MCPI may create different contexts in Indonesia. The differences of CLE between Indonesia and other English spoken countries mentioned above underlie different results using the English version of MCPI. Therefore, in this research, we aimed to adapt the MCPI into Bahasa Indonesia and perform the validation and reliability as an assessment for our medical school's CLE.

### **METHODS**

We performed this study at the School of Medicine and Health Sciences (SMHS), Atma Jaya Catholic University of Indonesia (AJCUI). The school has implemented ExBL in its clerkship phase. There have been studies of the learning environment at AJCUI medical school, but the clinical learning environment was never explicitly evaluated. The Ethical Board of AJCUI granted ethical clearance for this study.

A total of 155 students participated in our research. These participations were a non-random sampling

method. They were final (6th) year students who have completed all clinical rotations and were awaiting Indonesian National Competency Examinations (Ujian Kompetensi Dokter Indonesia/ UKDI) for students in the medical education program. They have previously asked and consented to participate in this study. They never repeated any clinical rotation for any reason (either of sickness or permission).

Students went through a different rotation of medical subjects. AJCUI medical school has fourteen subjects. There are surgery, internal medicine, pediatrics, obstetrics and gynecology, dermatology, ophthalmology, neurology, public health, forensics, psychiatry, radiology, anesthesia, dentistry, and otorhinolaryngology. Several hospitals and public primary health care are students' rotation' placement. There is ten hospital - either public or private - and seven Public Primary Health Care as AJCUI medical students' placement. The hospitals are Atma Jaya Hospitals, Syamsudin SH Public Hospital, St. Carolus Hospital, St. Antonius Hospital, Police Hospital, Central General Hospital Dr. Kariadi for forensics rotation, Cibubur Drug Dependence Hospital, Duren Sawit Psychiatric Hospital, Gading Pluit Hospital for surgery and radiology rotation, and Sitanala Central Public Hospital for dermatology rotation. Several North Jakarta Public Primary Health Care, such as Penjaringan District and Sub District, Kapuk Muara Sub-district, Kamal Muara Sub-district, Pejagalan Sub-district, and Pluit Sub-district, were placement for public health and obstetrics-gynecology rotation.

The primary hospital placement is Atma Jaya Hospital, having almost all rotation within it, except forensics. While there are also some specific hospitals and public primary health care, only accepting students for one medical subject rotation. Thus, we reached out to the AJCUI Medical School administration office. There, we were informed of student's placement for each rotation. The results we have now are from a minimum of two students for each placement and rotation.

MCPI was translated into Indonesian - forward translation - by a panel of researchers and clinical teachers of AJCUI Medical Education Unit (MEU). We then asked a language learning center

to proof-read and validate the translation. Along with the language learning center, we discussed MCPI Indonesian sentences and their compatibility with MCPI original context. The results of it then underwent back translate process into English. We asked ten of sixth-year medical school' students to answered the translation - face-validity test. All the students clearly understood the context of each question in Indonesian MCPI.

From the approved translation, we then transferred it into the online form. Students received the distributed form's Uniform Resource Locator (URL) after the informed consent. Students were asked to assess a specific rotation that has been determined before. Results were immediately acquired and formatted with Ms. Excel spreadsheet. We used the SPSS software to analyze the Indonesian MCPI.

To assess the Indonesian MCPI validity, we performed two methods: exploratory factor analysis (EFA) and item discrimination. EFA was deemed suitable for our case since there have yet any information on MCPI adaptation in Indonesian. Principal Component Analysis (PCA) and varimax rotation were conducted to evaluate construct validity to examine the inter-relationship among MCPI scales, selecting factors with eigenvalues >1. Item discrimination was also assessed across scales by calculating the correlations between each item and the total score. Correlations between items hypothesized to be in a given subscale and the subscale itself were corrected for the overlaps. Internal consistency reliability was performed by calculating the Cronbach's alpha coefficient. For the statistical analysis we utilized IBM SPSS Statistic 26.

## **RESULTS AND DISCUSSION**

Table 1 showed the participants' demographic features. There were 155 graduated medical students with 53 males and 102 females as participants for this study. The participants' age range was 23 to 25 years old, with 10 participants being 23 years old, 133 participants being 24 years old, and 12 participants being 25 years old. Each participant provided written informed consent after receiving a full explanation of the study's purpose and procedure as approved by the Ethical Commission of the Atma Jaya Catholic University of Indonesia.

**Table 1. Demographic Data of The Participants**

	N	%
Gender		
Male	53	34.19
Female	102	65.81
Age (y.o)		
23	10	6.45
24	133	85.81
25	12	7.74

We tested the MCPI questions item with Kaiser-Meyer-Olkin (KMO) measurement and Bartlett’s test of sphericity. The result of these two measurements will determine this study sample size’s appropriateness for the factor analysis method. The KMO measurement showed a value of 0.87, and Bartlett’s test of sphericity resulted in  $X^2(28)=535.93, p<0.05$ . These results indicated there were sufficient correlations between items of MCPI questions for factor analysis. To continue the analysis, we performed Principal Component Analysis (PCA). The PCA is powerful to summarize data into smaller categories using the principles of indices in a large dataset.

We chose to do the PCA method, in accordance with Humphreys and Montanelli since 1975. PCA was used to discover whether there is any variance (more than one variance) that could explain the structure of MCPI without eliminating the richness of the real data. Kaiser at 1960 recommends finding it out with an eigenvalue of at least equal to one is retained as

a full decomposition. An eigenvalue is a coefficient number used to calculate the original variables’ variance, accounted for each component.

We administered the PCA on the eight items with orthogonal rotation (varimax). Table 2 showed the result of PCA. There are three sections within the table: the first related to initial eigenvalues, the second related to extraction sums of squared loadings, and the third related to rotation sums of squared loadings. Our study followed the Eigenvalue criterion of 1 (Kaiser’s). There is only one component within the table with a total initial Eigenvalue of more than one. However, the SPSS analysis could continue the extraction sums through the second component with a total cumulative of 64% with total eigenvalue for each component more than one. After extraction, the dataset gave sums of squared loadings in which two categories cumulatively defined 64% of the total variance. The third column showed the total variance attributed to the categories after the rotation. Again, it showed that the dataset could explain cumulative 64% of total variance by dividing it into two categories. Therefore, the result signifies that we can reduce the MCPI data set’s complexity by using only two subscales while maintaining 64% of data resourcefulness. After we determine there will be two subscales, SPSS rotated the eight items of MCPI to get a more even cumulative ratio. The variance showed the variance ratio accounted by each component (subscales) to all variables’ total variance. Thus, we could later see items with similar ratio grouped into one subscale.

**Table 2. Results of Primary Component Analysis (PCA)**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	4.30	53.79	53.79	4.30	53.79	53.79	2.77	34.57	34.57
2	0.82	10.30	64.09	0.82	10.30	64.09	2.36	2.36	64.09
3	0.81	10.10	74.20						
4	0.53	6.59	80.79						
5	0.51	6.33	87.12						
6	0.42	5.21	92.32						
7	0.38	4.73	97.06						
8	0.24	2.95	100.0						



After we determine the two subscales, we move to specify which item goes into which subscale. The items were rotated as in a component matrix three times, then we got the result as loading factors (Table 3). The result consolidated each item matched to be put under specific subscale. We could see the correlations between each of the variables and the estimated subscales. Leadership, reception, people, facilities, and organisation have similar correlation strength to Subscale I (0.60-0.71). Therefore, we grouped these five items into Subscale I. On the

other hand, we could also conclude that instruction and observation have similar correlation strength with Subscale II (0.86-0.89). As we could see, the score for feedback is not quite near enough to either subscales, which means it could be included in either of the subscales. We followed the original MCPI structure to settle Feedback in Subscale II. We named the subscales according to the original MCPI scale. Subscale I entitled as 'learning environment' and subscale II entitled as 'training', for each item matched the exact subscales as the original MCPI.

**Table 3. Factor Loading of The Final MCPI**

Items	Subscale I	Subscale II
	Learning Environment	Training
Leadership	0.71	0.19
Reception	0.69	0.36
People support)	0.68	0.34
Facilities	0.69	<0.1
Organisation	0.60	0.49
Instruction	0.29	0.86
Observation	0.19	0.89
Feedback	0.59	0.54

Items Feedback showed the lowest factor loading analysis, either with Learning Environment subscale (0.59) or Training subscale (0.54). Intriguingly, it has the highest correlation with the total score (0.72). Feedback is an act of describing specific activity intended to guide future performance on related activity.<sup>13</sup> Feedback has been an integral part of training medical students. Students seeking feedback will be better at adapting, learning, and performing new skill sets.<sup>13</sup> Feedback is a way of informing students of their progress, more importantly in clinical placements. Within the placements, students will learn and gain new skills and experience. Thus, they will have to adapt to the new learning process. Constructive feedback, either formative or summative, is useful to reinforce good practice and motivate the learner towards their desired outcome.<sup>14</sup> These reasonings drive us to decide to place items Feedback into Subscale II, Training.

We further tested the MCPI's validity with corrected item-total correlations. This test determines whether each item has a consistent correlation (critical value > 0.30) with the whole MCPI items. Table 4 showed corrected correlations between all items and total score. The result was significant (range: 0.47-0.72), while corrected correlations between all items and respected factor scores were also significant. The Learning Environment factor showed significant corrected correlations between all items and the Learning Environment subscale (range: 0.47-0.62). The Training subscale showed significant corrected correlations (range: 0.60-0.74).

The results of items Facilities had the smallest correlation with the total score (0.47). Thus, the result of item Facilities has the least correlation with the full result of the MCPI scale, but it does not reduce the validity level of the MCPI subscale.

Table 4. Corrected Correlation with Total Score and Subscale Score

Item labels	Corrected correlation with total score	Corrected correlation with Learning Environment subscale score	Corrected correlation with Training subscale score
Leadership	0.55	0.52	
Reception	0.66	0.62	
People	0.64	0.62	
Facilities	0.47	0.47	
Organization	0.69	0.62	
Instruction	0.69		0.75
Observation	0.63		0.69
Feedback	0.72		0.60

We assessed the MCPI's reliability with the internal consistency method. We set the limit of reliability with Cronbach's alpha of more than 0.7. MCPI reliability test of internal consistency showed the total subscale' score (Cronbach's alpha = 0.87) was higher than that of the subscales (Learning Environment subscale: 0.78; Training subscale: 0.82). There was no escalation of item coefficient even when we added deleted items. The Cronbach's alpha of the total subscale, Learning Environment Subscale, and Training Subscale are higher than 0.6. Therefore, we conclude that Indonesian MCPI proves to be reliable.

An earlier study showed that while it has few items, MCPI achieved equivalent discrimination between placements to another instrument with more items, e.g., DREEM.<sup>11</sup> There have been comparisons of MCPI and DREEM - currently the most used learning assessment in Indonesia. MCPI has a robust total score correlation with DREEM. Thus, we could understand that both are similar domain assessments.<sup>8</sup> On the other side, DREEM item numbers are more often overwhelming to students and might cause incorrect evaluation.<sup>5</sup> The generalisability analysis also favored MCPI. This study showed that our Indonesian version of the 8-item MCPI reliably measured the quality of workplace learning environments for undergraduate medical students and their training. To our knowledge, there has no previous study that translates MCPI into the Indonesian language.

This study appeared in the Indonesian MCPI (I-MCPI) validated at a significant range of 0.47-0.72 of corrected correlation with the total score. It has two subscales, which are Learning Environment (Lingkungan Belajar) and Training (Pelatihan). The I-MCPI is reliable with its Cronbach's alpha of 0.87. We have examined each item, and we concluded leadership (kepemimpinan), reception (penerimaan), people (orang-orang), facilities (fasilitas), and organization (organisasi) as the components of the Learning Environment subscale. The training subscale consists of three items: instruction (instruksi), observation (observasi), and feedback (umpan balik). The I-MCPI is available in the supplement of this article.

There have been several adapted CLE assessments worldwide. Postgraduate Hospital Educational Environment Measure (PHEEM) is one of established CLE assessment made in 2005 by Ross et al.<sup>15</sup> PHEEM focuses on assessing three domains, which are students' role of autonomy, teaching, and social support.<sup>16</sup> This assessment tool has been translated into several languages such as Greece, Portuguese, Persians, and French. PHEEM have been applied in the Europe, West Asia and Morocco.<sup>16-19</sup> It consists of 40 statements which are scored on a five-point Likert scale.<sup>19</sup> There have been studies about PHEEM's consistency and that has its reliability and ability to assess CLE as a multi-dimensional instrument. However, there were different global overall scores and different subscales across PHEEM translation in the UK, Brazil, Chile, and the Netherlands.<sup>20</sup>

To compare with other health allied fields, the field of nursing education seems to be more robust in developing the CLE standards through its assessment. The Clinical Learning Environment and Supervision (CLES), and Vietnamese - Clinical Learning Environment Inventory (V-CLEI) are two CLES adaptation cases.<sup>21,22</sup> Their adaptations were based on the importance of translating the whole assessment appropriately in their language, the assessment's function, and the cultural context. A group of researchers in Karolinska Institute adapted the CLES to assess the CLE of medical students in primary health care.<sup>15</sup> The adaptation from a nursing education assessment into an assessment for medical students, resulted a highly validated and reliable measurement of CLES.<sup>21</sup>

The second case of adaptation is V-CLEI from its original English version. The growing social, economic situation in Vietnam forced the health sector also to develop its healthcare quality. Nursing education is part of the focus of the Health Minister of Vietnam. Therefore, the CLE assessment with the Vietnam context is critical. The effort to adapt and validate the CLEI into V-CLEI unlikely to be successful.<sup>22</sup>

Each assessment has its strong points. Comparing to other assessments, the MCPI allows describing a more in-depth students' standpoint. Students are required to write their descriptive and qualitative assessments toward each clinical rotation in given spaces. This step also considers students' reflection toward the CLE. The MCPI gathers descriptive textual as well as numerical information. The numerical or the quantitative data were gathered from the Likert Scale on several statements. Moreover, the descriptive textual or qualitative results came from students' free comment sections for each statement. Therefore, I-MCPI can inform the faculty of the need to improve placement quality and implementations. This quality brings another ability to comprehend the context of students' summative review. Further qualitative research is currently in progress. We have started this study on students of final year medical school (6th year). The results will be reported on a different article, collaborating with the team who has made the original MCPI.

There are several limitations of this study. This study relied on only one medical school. A more extensive data set is essential to improve I-MCPI psychometric properties and determine the transferability of I-MCPI in other medical students' cohorts. Either in different medical schools or different groups of medical students. It will be interesting too to seek I-MCPI in various medical schools in Indonesia's more significant areas. We performed this study during the COVID-19 pandemic. Problems in collecting data was a significant thread in this study. Therefore, we contacted each student personally to informed them and got their consent. We considered safety and decided to make I-MCPI in the online form. Although there might be some impact on the qualitative results, it did not significantly affect I-MCPI's validity and reliability.

CLE is a part of Competence-Based Medical Education (CBME). CBME is composed of competencies or predefined abilities as the outcome of the curriculum. To achieve the maximum outcome, it needs contextual learning created from appropriate opportunities for learners. CLE should provide students access to related resources and useful feedback during practice.<sup>23</sup>

It has been a long time coming to re-assess CLE in many Indonesian medical schools. The complexity of CLE is undeniable, and clinicians who have met hundreds and thousands of students each year have obligations to ensure their teaching effectivity on each student.<sup>17</sup> These obligations were hard to convey when there is no exact starting point in the process. The MCPI's results could provide CLE's reality in the clinical settings and help improve a capable doctor.

Indonesian medical schools have been placing students in many hospitals as part of our education. It has its benefits to form students' professional identity and experience many various causes of diseases. Teaching hospitals have a crucial role in the outcome of education.<sup>3</sup> Thus, there is a need to evaluate the curriculum and each of the teaching hospitals. Moreover to determine, either these hospitals are fit as an educational placement or improvement on some.



Indonesia is now facing a great crisis where there is a dire need for capable doctors in the front line of the COVID-19 pandemic. The quality of our graduates proves to be important right now. This quality not only needs to be maintained but also to be enhanced. The incoming medical graduates from other ASEAN countries and the advancement of health and telehealth among countries will be ample opportunity and threads for Indonesian medical graduates. Therefore, standards of CLE and their assessment are crucial. The I-MCPI would provide the data required to improve the Indonesian medical education clinical curriculum and a fully-competent, capable Indonesian medical graduate.

### CONCLUSION

This study has successfully adapted MCPI into Bahasa Indonesia. Indonesian MCPI (I-MCPI) is a potential tool to evaluate Clinical Learning Environment (CLE) in Indonesia medical schools. The adaptation went through processes: (1) forward translation into Bahasa Indonesia, (2) proof-reading process, (3) backward translation, and (4) face-validity of the translation. Through the factor analysis and item correlation, we concluded that two subscales are composing I-MCPI, which are Learning Environment Subscale and Training Subscale. These two subscales are following the original MCPI. I-MCPI is a valid assessment to evaluate CLE, proven with a significant score of corrected item-total correlations (0.60-0.89). It has high reliability of Cronbach's alpha of 0.87. I-MCPI is a potential assessment tool to evaluate Indonesian CLE, particularly in hospital and primary care settings. Further study is required to determine I-MCPI transferability in other clinical students' cohorts. Since the study is limited to the final year students who have completed all clinical rotations, another cohort of students in the middle of medical schools' clinical rotation would enrich I-MCPI adaptability in evaluating I-MCPI.

### RECOMMENDATION

A more extensive data set is essential to improve I-MCPI psychometric properties. Other medical schools with various cohorts of clinical phase medical

students will undoubtedly raise the application of I-MCPI. It is also essential to follow up the results of the assessment using I-MCPI. In return, I-MCPI will fulfill its useability once the medical schools improve their quality based on students' evaluation of the CLE. The qualitative part of MCPI is a valuable resource to improve specific qualities of CLE. Further analysis of the MCPI qualitative part will be the next agenda of this research group. Similarly, we recommend other medical educators' research groups to analyze the qualitative inputs from students' evaluation toward CLE.

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### COMPETING INTEREST

The authors declare that there are no competing interests related to the study.

### AUTHORS' CONTRIBUTION

**Carolyn** – developing research proposal, collecting data, data analysis, and publication manuscript.  
**Arnold Lukito** – collecting data and data analysis.  
**Audelia Kathleen Sulaiman** – collecting data and data analysis.  
**Elisabeth Rukmini** – developing research proposal and publication manuscript.

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