Validity And Reliability Test For Research Instruments Regarding Health Professional Student Satisfaction Towards Online Learning During The Covid-19 Pandemic

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Abstract: *In the conditions of the COVID-19 pandemic, the strategies carried out to break the chain of transmission, one of which is by limiting social activities. A physical distancing policy has also been created which causes the face-to-face teaching and learning process to be transformed into an online learning system. Research is needed on the factors that can affect the satisfaction of health professional students related to online learning which requires valid instruments to answer research problems. The aim of study is determining the content validity of the questionnaire as a research instrument on the factors that influence health professional student satisfaction with online learning during the COVID-19 pandemic. The content validity of the instrument was carried out on 52 statement items by 7 experts. The validated instrument is an online questionnaire which refers to and adopts and modifies the questionnaire used by Pei-Chen Sun. The results of the validation of the 52 statement items obtained S-CVI/Ave by 7 experts of 0,953, S-CVI/Ave based on I-CVI of 0,945, S-CVI/UA of 0,731. Initial CVI of 0.890, but 4 items were eliminated, there were 48 statement items used as a research instrument with a final CVI of 0.935. The reliability test results obtained a Cronbach's alpha coefficient value is 0.912. Calculating CVR, CVI and Cronbach's alpha coefficient ensures that the questionnaire used as a research instrument is valid and reliable to assess the factors that influence health professional student satisfaction with online learning during the COVID-19 pandemic.*

Keywords: Validity, Reliability, Student Satisfaction, Online Learning, COVID-19.

1. INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a new disease caused by the novel coronavirus or 2019-nCoV which is one of the single stranded ribonucleic acid (RNA) viruses, another name for COVID-19 is Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) [1]. The development of this virus has rapidly spread throughout the world, according to data from the World Health Organization (WHO) dated June 30, 2020, as many as 10,185,374 people tested positive, 503,862 people died and 216 countries have contracted COVID-19[2]. The first confirmed case in Indonesia occurred on March 2, 2020. According to data from the Ministry of Health of the Republic of Indonesia dated June 30, 2020, in Indonesia 56,385 people have been confirmed positive for COVID-19 with 2,876 of them passed away [3].

COVID-19 is a contagious disease that can spread directly or indirectly, from one person to another. This has led the Indonesian government to implement a strict policy to break the chain of the spread of COVID-19, one of which is limiting community interaction which is applied in terms of physical distancing. The physical distancing policy also applies in the world of higher education so that the teaching and learning process, especially in the health sciences, must be carried out from home [4]. The Indonesia government decided that students learn from home, move the teaching and learning process on campus to at home by implementing the work from home (WFH) policy for lecturers [5]. The Minister of Education and Culture of the Republic of Indonesia modified the Teaching and Learning Activities (TLA) process which is usually face-to-face on campus to become TLA using an online learning system based on the regulation of the Minister of Education and Culture of the Republic of Indonesia No.4 of 2020 concerning Policy Implementation and Education in an Emergency Period for the Spread of COVID-19 and supported by regulation of the Minister of Education and Culture of the Republic of Indonesia No.3 of 2020 concerning the Prevention of COVID-19 in education units [6,7].

Following up on this regulation, various faculties in Indonesia issued some regulations related to the TLA using an online learning system during the COVID-19 pandemic. One of them is the faculty in the health sector including the faculties of medicine, dentistry and nursing, which previously had a learning system that was different from other faculties. The learning system in these three faculties uses a competency-based curriculum (CBC) with a Problem-Based Learning (PBL) approach. Activities carried out are expert lectures, tutorials, lab skills, practicums and others carried out face-to-face [8]. Because face-to-face activities cannot be done, learning turns into an online system using a laptop or computer, and a smartphone connected to an internet network connection [9].

Online learning is a learning process whose implementation is supported by information technology that utilizes the internet as methods of interaction and facilitation that affects student satisfaction [10]. Aspects that affect online learning satisfaction according to literature are very diverse, including student and student interaction or student and teacher. Two distinct roles of the instructor, the formal role (teaching attendance), and the informal role (closeness behavior), and found that both teaching roles influenced student perceived learning outcomes and satisfaction in online learning [11,12]. Other factors were

interpersonal behavior and learning frequency [13,14]. Another aspect that has received great attention is social presence, which is defined as the anticipation of participants in online interactions [15]. Another factor that affects student satisfaction with online learning is the perceived benefits and ease of learning, perceived use by students, flexibility of online learning, discussion sessions, time spent on online learning [16,17]. Technology is also a relevant factor affecting online learning satisfaction, for example computer skills, initial knowledge of online learning technology, and anxiety about using computers [18].

Thus, there are many factors that affect student satisfaction with online learning, but it is not yet known what factors affect health professional student satisfaction with online learning during the COVID-19 pandemic considering that health professional students will later become at the forefront of dealing with health problems in society. So that we need an analysis that can investigate these factors, a research is needed to answer this problem. The research instrument chosen was a questionnaire that was modified from the literature. In order for the research results to be scientifically accounted for, it is necessary to test the validity of the contents of the questionnaire [19]. The validity of the content will be carried out by a panel of experts who are very understanding of the research problem [20]. In some literature it takes a minimum of 5 experts to validate the contents of the instrument [20,21,22].

Content validity is a content validation technique for the contents of the instrument by assessing the relevance of the questions or statements in the questionnaire to be filled out by the respondent, the results of the content validity really help the researcher in ensuring that the questionnaire matches the questions asked, the objectives and benefits of the study [19,21,23]. Purpose of content validation The questionnaires are as follows: (1) develop a questionnaire that describes the factors that affect the satisfaction of health professional students with online learning during the COVID-19 pandemic (2) to determine the validity of the questionnaire content as a research instrument.

2. METHOD

Ethical approval
This research has been approved by the Health research ethics committee at the Faculty of Medicine, Syiah Kuala University / Zainoel Abidin Hospital No 195 / EA / FK-RSUDZA / 2020 and before data collection, the researchers conducted a questionnaire validity test conducted by experts as validators. All validators agree to participate in the validity test by signing the electronic consent form on the Google form before evaluating the contents of the questionnaire.

Instrument
This study uses an instrument development design to determine the validity of the contents of the questionnaire. The tool or instrument used in this research is an online questionnaire which refers to a literature review and conceptual framework. Researchers adopted and modified the questionnaire applied by Pei-Chen Sun et al [13] in their research entitled "What

drives a successful e-learning? An empirical investigation of the critical factors influencing learner satisfaction" developed by researchers that will be shared with respondents.

Validity and reliability test procedure

In this study, the validity and reliability of measuring instrument based on reasoning was tested. The content validation process is carried out based on professional judgment by the expert group to determine the validation of the content of the items both in terms of material, question construction, and in terms of clarity of the language prepared. The validity test in this study uses the opinion of the experts (expert judgment) and the reliability test was conducted by student. The steps in determining the validity of the content dan the reliability test can be carried out in seven steps, namely: (1) preparation of the content validity form, (2) determining the expert who reviews the validity of the content, (3) assessing the relevance of statement items by the reviewer, (4) determining the score of each statement item, (5) calculating the Item level Content Validity Index (I-CVI), Scale level Content Validity Index (S-CVI), Content Validity Ratio (CVR), and Content Validity Index (CVI), (6) determining the validity of the contents of the questionnaire [19,20], (7) reliability test, after the validity test is carried out, and the results are obtained, the questionnaire items that are valid are tested for reliability.

3. RESULTS AND DISCUSSION

Step.1. Preparation of the content validity form

This instrument aims to develop a comprehensive tool to describe the factors that influence health professional student satisfaction with online learning during the COVID-19 pandemic. The content validity form is structured in such a way that the reviewer can easily understand the contents of the questionnaire and can provide appropriate assessments and provide suggestions for correcting sentences in the questionnaire.

Step.2. Determination of experts who review the validity of the content

To determine who reviewed and criticized the validity of the content of the research instrument, someone who had scientific qualifications who mastered the field of research was selected, also seen from their professional abilities and expertise. [19]. Experts are selected based on the following criteria: (1) have a master's or doctoral degree, (2) a specialist or consultant in medicine, nursing or dentistry, (3) have experience academic for five years or more, (4) having experience in the fields of medicine, dentistry and nursing, (5) having experience in reviewing the validity of the contents of the questionnaire [20]. In this study, content validation was carried out by involving 7 experienced experts in their fields consisting of 3 medical faculty lecturers, 2 dentistry faculty lecturers and 2 nursing faculty lecturers. The characteristics of the 7 experts can be seen in table 1.

Table.1. Characteristics of panelists who assess the validity of the contents of the questionnaire

No.	Expertise	Academic experience (years)	Qualifications	Institution/Faculty
1.	Doctor of Medical Sciences	14	Doctoral/ Consultant	Medicine
2.	Master of Medical Sciences	12	Mastery/Consultant	Medicine
3.	Master in Disaster Management	6	Mastery	Medicine
4.	Master in Community Nursing	11	Mastery	Nursing
5.	Master in Community Nursing	14	Mastery	Nursing
6.	Master of Dental Sciences	10	Mastery	Dentistry
7.	Master of Health	11	Mastery	Dentistry

Step.3. Assessment of the relevance of statement items

In testing the validity of the questionnaire content, it was carried out using an online systems, the researcher sent the questionnaire content validity form via email or other social media. Researchers provide information related to the research conducted and ask experts for approval to participate as validators. Before assessing the relevance of the research instrument, the researcher explains the research questions, objectives and benefits of the study. In the content validity assessment carried out, the experts have agreed verbally and in writing and are willing to fill in and validate the statement items on the content validation form. Experts are given the freedom to give their views on the relevance of each item and are also asked to provide suggestions for improvements in both the grammar and content of the statement [23,24].

In this study, an assessment was carried out of the factors that affect the satisfaction of health professional students with online learning during the COVID-19 pandemic. The content validity form has been given an explanation of what the experts should judge. Experts provide comments on each questionnaire statement according to their expertise. The experts write their suggestions in the column provided. This suggestion is used to increase the relevance of the questionnaire content [22]. Some of the corrections needed to improve the contents of the questionnaire consist of correction of sentence structure and word selection, clarification of confusing terms and grammatical appropriateness, and also suitability of letter size and structure of the contents of the questionnaire [24].

Step.4. Determination of the score of each statement item

This validity test uses the score determined by the reviewer. After the reviewer has given a score for each item being assessed, the reviewer sends back the results of the assessment to the researcher. [19]. Instructions for filling the validity of the content, reviewers are asked to provide an assessment of the parameter/item statement by looking at its relevance (suitability) with existing aspects. For the relevance scale used a 4-point Likert scale. The ranking ranges from 1 to 4 with the following details: 1 = not relevant, 2 = somewhat relevant, 3 = moderately relevant, 4 = very relevant. Ratings 1 and 2 are considered invalid content, while ratings 3 and 4 are considered valid content [21,22,25]. The list of statement items that were tested for validity can be seen in table 2.

Table.2. List of statement items that were tested for validity

Item	Statements
	Attitude of students
P1	I think using an online learning system is a good idea
P2	I think students now prefer online learning systems
P3	In my opinion, by using the online learning system I get more knowledge
P4	I think studying using an online learning system makes it easier for me to understand learning
P5	I prefer online learning systems to face-to-face learning systems
	Student intention
P6	I will be using the online learning system frequently for the next few months
P7	I will continue to use this online learning system even though the COVID-19 pandemic is over
P8	I think the current online learning system makes me more productive
P9	I think the time spent in this learning system is very relevant to me
P10	I received feedback on assignments / exams for this learning system on time
P11	I think the frequency of learning expert lectures in this online learning system is suitable for me
P12	I think the frequency of learning the skills lab in this online learning system suits me
P13	I think the frequency of learning tutorials and practicums in this online learning system is suitable for me
P14	During online learning, I am aware of my strengths and weaknesses in learning
	Ease of use
P15	In my opinion, the online learning system makes it easy for me to manage my daily schedule effectively
P16	In my opinion, the online learning system saves me more time than face-to-face learning
P17	I am satisfied with the speed of the internet network that I use
P18	In my opinion, the online learning system has good flexibility
P19	In my opinion, online learning using platforms such as zoom, Gmeet, and video

	conference is more effective than whatsapp groups
P20	I feel confident looking for the necessary information on the internet for a particular topic
P21	In my opinion, I was skilled at using technology during this online learning period
P22	In my opinion, learning to operate an online learning system is easy
	Communication
P23	I can easily communicate with other students in this online learning system
P24	I can easily communicate with lecturers in the online learning system using either the zoom or the WhatsApp group
P25	I can receive announcements / notifications regularly when using the online learning system
P26	Lecturers provide sufficient time to communicate with students
P27	I can access learning materials easily
P28	I feel that interacting using face-to-face applications makes me better understand online learning
P29	I find it easy to follow discussions in online classes
	Performance expectations
P30	In my opinion, using an online learning system makes learning easier for me
P31	In my opinion, using online learning doesn't allow me to do more work in a short amount of time
P32	With this system it makes it easier for me to do campus assignments
P33	The online learning system will improve my academic performance
P34	In my opinion, the level of learning that I get in this online learning system is of high quality
P35	In my opinion, online learning systems require more money than conventional learning systems
P36	I feel that tutorials are very effective in online learning
P37	In my opinion, online learning will be effective if every lesson is recorded and can be accessed at any time
	Facility conditions
P38	I easily access the courses taught during the online learning system
P39	In my opinion, the availability of a smooth internet facility is very important in this online learning
P40	The lecturer gave me instructions in choosing the right livelihood terms to support my learning
P41	All online learning systems in use today are easy to find and use
P42	Lecturers facilitate discussions in the online learning system
P43	Lecturers actively encourage me to participate in learning
P44	In my opinion, the online learning system is effectively used to train my skills as a medical worker
P45	In my opinion, the online learning system is only effectively used for theoretical learning

	Anxiety Using Technology
P46	I feel restless using this online learning system
P47	I don't want to use this online learning system for fear of making mistakes
P48	This learning system intimidates me a bit
P49	Learning using this online learning system makes me feel uncomfortable and confusing
	Student satisfaction
P50	I am satisfied with the online learning system during this pandemic
P51	I am satisfied with the skills lab activity using the online learning system
P52	I am satisfied with the tutorial discussion activities using the online learning system

Step.5. Calculation of I-CVI, S-CVI, CVR, and CVI

In determining the content validity of the instrument, several methods were used, namely I-CVI, S-CVI, CVR, and CVI. The following is shown the definitions and equations of each measurement method [19,21,26].

1.   I-CVI: Proportion of experts giving the relevant score 3 or 4 on each item.

$$I - CVI = \frac{Number\ of\ items\ agreed}{Number\ of\ experts}$$

2.   S-CVI/Ave: Mean I-CVI scores for all items on the scale or the average of the proportions' relevance as rated by all experts. The relevant proportion is the average rating of relevance by each expert.

$$S - CVI/Ave = \frac{\sum I - CVI}{Number\ of\ Test\ Items}$$

3.   S-CVI/UA: Proportion of items on the scale that reached the relevance scale of 3 or 4 by all experts. The universal agreement (UA) score is given 1 if the item reaches 100%, otherwise the UA score is given 0 if it does not reach 100%.

$$S - CVI/UA = \frac{\sum UA\ scores}{Number\ of\ Test\ Items}$$

4.   CVR: One way to test the content validity developed by Lawshe (1975) by assessing an instrument material by experts. The CVR test is intended to determine the accuracy of the measuring instrument so that it is able to measure something you want to measure.

$$CVR = \frac{ne - \frac{N}{2}}{\frac{N}{2}}$$

5.   CVI: The sum of the mean CVR score divided by the total number of items.

$$CVI = \frac{\sum CVR}{Number\ of\ Test\ Items}$$

Step.6. Determining the validity of the contents of the questionnaire

To determine the content validity was done by calculating I-CVI, S-CVI / Ave, S-CVI / UA, CVR and CVI from expert judgment [20]. The results of the calculation of the agreement between assessors in the form of CKI and I-CVI and CVR can be seen in table 3. The level of validity is determined by looking at how many reviewers find the relevance of the contents of the questionnaire to the research objectives. If it is found that more than 70% of experts judge the content of the statement is relevant then the item is declared valid [24].

The Cohen Kappa Index (CKI) can be determined by looking at the suitability level of all reviewers for each questionnaire statement item. CKI is often referred to as the agreement between most of the evaluators, usually expressed as a percentage [20]. If the CKI is determined by a percentage, it is different from the Content Validity Index (I-CVI) item which is indicated by a decimal number. CKI and I-CVI actually have the same meaning [19].

I-CVI is the number of items agreed upon divided by the number of all experts [19,21,22]. I-CVI must be 0.70 or higher, with seven experts. I-CVI lower than 0.70 need to be revised or removed [21,27,28]. In this study, for the I-CVI calculation, forty seven items (90.39%) were marked as appropriate and the I-CVI ranged from 0.571-1.00. Thirty-eight items had an I-CVI score of 1.00, nine items with a score of 0.857, four items with a score of 0.714, and one item with a score of 0.571. Values range from 0 to 1 where I-CVI> 0.79, the relevant item, between 0.70 and 0.79, the item needs revision, and if the value is below 0.70, the item is omitted.

Table.3. Results of the calculation of CKI, I-CVI and CVR

Items	E1	E2	E3	E4	E5	E6	E7	R	NR	Ne	CKI	CVR	I-CVI	Interpretation
P1	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P2	3	3	1	4	1	3	4	5	2	5	71,4	0,429	0,714	Eliminated
P3	4	4	3	4	4	3	4	7	0	7	100	1,000	1,000	Used
P4	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P5	2	2	4	4	4	4	4	5	2	5	71,4	0,429	0,714	Eliminated
P6	4	4	4	4	4	3	3	7	0	7	100	1,000	1,000	Used
P7	1	1	4	4	4	3	2	4	3	4	57,1	0,143	0,571	Eliminated
P8	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P9	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P10	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P11	4	4	3	4	4	2	4	6	1	6	85,7	0.714	0.857	Used
P12	4	4	3	4	4	2	4	6	1	6	85,7	0.714	0.857	Used
P13	4	4	3	4	4	2	4	6	1	6	85,7	0.714	0.857	Used
P14	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P15	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used

P16	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P17	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P18	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P19	1	1	4	3	4	4	4	5	2	5	71,4	0,429	0,714	Eliminated*
P20	4	4	3	4	4	3	4	7	0	7	100	1,000	1,000	Used
P21	4	4	3	4	4	3	4	7	0	7	100	1,000	1,000	Used
P22	4	4	1	4	4	4	4	6	1	6	85,7	0.714	0.857	Used
P23	4	4	3	4	4	4	4	6	1	6	85,7	0.714	0.857	Used
P24	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P25	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P26	4	4	4	4	2	4	4	6	1	6	85,7	0.714	0.857	Used
P27	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P28	4	4	3	4	2	4	4	6	1	6	85,7	0.714	0.857	Used
P29	4	4	3	4	2	4	4	6	1	6	85,7	0.714	0.857	Used
P30	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P31	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P32	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P33	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P34	4	4	3	4	4	2	4	6	1	6	85,7	0.714	0.857	Used
P35	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P36	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P37	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P38	4	4	3	4	4	4	4	7	0	7	100	1,000	1,000	Used
P39	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P40	4	4	4	4	4	2	4	6	1	6	85,7	0.714	0.857	Used
P41	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P42	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P43	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P44	2	2	4	4	4	4	4	5	2	5	71,4	0,429	0,714	Eliminated
P45	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P46	4	4	4	4	4	3	4	7	0	7	100	1,000	1,000	Used
P47	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P48	4	4	3	3	4	4	4	7	0	7	100	1,000	1,000	Used
P49	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P50	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P51	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
P52	4	4	4	4	4	4	4	7	0	7	100	1,000	1,000	Used
Ave	0,92	0,92	0,96	1,00	0,92	0,96	0,98	S-CVI/Ave by 7 experts= 0,953				CVI= 0,879	S-CVI/Ave based on I-CVI= 0,945	

(P= Point, E=Experts, R=relevant, NR= not relevant, Ne = Number of experts who agree, I-CVI= Item level Content Validity Index, CVR= Content validity ratio, S-CVI/ave: The average agreement value of all experts on statement items based on I-CVI=0.945, S-CVI/ave based on the average proportion of items judges as relevance across the seven experts = 0,953. S-CVI /UA: The average agreement value of all experts on statement items based on universal agreement = 0,731)

S-CVI is the average value of I-CVI for all scale items. The validity test is highly recommended when the S-CVI value is equal to or above 0.90 [19,20,21]. The value of relevance and suitability of each statement item can be seen in table 3. In table 3, the average value of the suitability of all experts in the statement item is obtained. (S-CVI / ave) based on I-CVI is 0.945 and the average value of the proportion of the relevance of the statement items assessed by 7 experts is 0.953. S-CVI / UA: Mean agreement score of all expert statement items based on universal agreement was 0.731.

All calculations of the content validity ratio (CVR) can be seen in table 3. In this study, for CVR calculations, forty-seven items (90.39%) were marked accordingly and CVR scores ranged from 0.143 to 1.00. Thirty-eight items had an I-CVI score of 1.00, nine items with a score of 0.714, four items with a score of 0.429, and one item with a score of 0.143. The CVR must be 0.622 or higher, for a total of seven expert assessments. CVR lower than 0.622 was deleted or revised [27,28].

In addition to calculating the CVR of each statement item, we must also calculate the CVI value. The CVI value is the average result of the CVR, which is 0.890. The assessment of the CVR value is a negative CVR value if less than 50% of the validators agree with the contents of the questionnaire item and if 50% is correct then the value is 0, then this item must be deleted; and if more than 50% of the validators agree, the CVR value is between 0 - 1 [21,26]. If the value of each item is above the critical value, the item is accepted as one of the items that are considered valid for the contents of the questionnaire [26]. The critical value of the CVR based on the number of validators as listed in table 4 [29].

Table.4. CVR Critical Value (one-tailed, α = 0,05)

Number of Validators	CVR Critical Value
5	0,736
6	0,672
7	0,622
8	0,582

After calculating the CVR and I-CVI of each item, the results of several statement items must be eliminated, even though according to the researcher, the statement item is very important to answer the research question. These results indicate that of the 52 statements there are 5 statements that must be revised or eliminated (see table 5), because the CVR is lower than the critical value (0.622). But after discussion, the validators suggested a sentence change in item

P19. This item is very important to be included in the questionnaire because it is in accordance with the research objectives. Item P19 was changed in the editorial to: in my opinion, online learning using video conferencing is more effective than group chat. After revision the validators agreed that the item was included as one of the items in the questionnaire of this study, so that there are 48 valid items. After eliminating 4 statement items, the CVI value becomes 0.935. From the CVI value, it can be said that the validity of the instrument content is very high level.

Table.5. List of revised or eliminated statement

Items	Statements item was eliminated	Panelist comment
P2	I think students now prefer online learning systems	the impression that observing the tendencies of others is generally not the perception of the respondents themselves
P5	I prefer online learning systems to face-to-face learning systems	repetition of sentence number P2
P7	I will continue to use this online learning system even though the COVID-19 pandemic is over	the context of this research during the COVID-19 pandemic, after that period is no longer relevant
P19	In my opinion, online learning using platforms such as zoom, Gmeet, and video conference is more effective than whatsapp groups	not quite right if you include the name of the application (platform), maybe it can be replaced with the system name instead of the commercial name
P44	In my opinion, the online learning system is effectively used to train my skills as a medical worker	It looks like the skill can't be learned online except for the simulation

Step.7.Reliability test

Reliability test is carried out to determine the extent to which a measuring instrument can be trusted or reliable [28]. This indicates the extent to which the collection results are consistent when two or more measurements of the same symptoms are taken using the same measuring instrument. In this study, the reliability test was conducted on 30 health professional students. For the reliability test, Cronbach's Alpha equation is used:

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_r^2}\right)$$

(Information: $\Sigma\sigma i2$ = the number of score variants for each item, $\sigma r2$ = total variance, n = number of items)

The results of the answers of 30 respondents were inputted and analysed by using SPSS by comparing Cronbach's Alpha values with constant values. If the Cronbach's Alpha value is

found to be greater or equal to the constant value, then the questionnaire is declared reliable. One method of determining the reliability value of the instrument is to calculate the Cronbach alpha coefficient. Cronbach alpha coefficient has a value range of 0 to 1, an instrument is considered reliable if in the preliminary research the Cronbach alpha coefficient value is 0.70 or more. The expected coefficient value in basic research is 0.80 and in medical research it is 0.95 [28]. An instrument that is considered reliable if the Cronbach alpha coefficient value is 0.7 to 0.90 [23]. In this study, the Cronbach alpha coefficient value was 0.912 (see Appendix), so it can be said that the research instrument is reliable.

The advantage of testing the validity and reliability of this research instrument is the content validity test by using CVR which is carried out by experts which of course really helps researchers in carrying out their research so that the research carried out can measure with high accuracy and precision to determine the factors that affect health professional student satisfaction with online learning during the COVID-19 pandemic. Another advantage is that in doing the validation, the experts are given the flexibility of time so that the answers given are as objective as possible. Seeing so much information generated from the validity and reliability of this questionnaire, it is possible to carry out several studies, alternatives both in terms of quantitative and qualitative aspects.

The limitation of this questionnaire validity and reliability test is that the assessment is only carried out by experts in one institution, namely Syiah Kuala University, so that the results of this validation may not be relevant for other institutions, so it is very good if assessors from external institutions are added.

4. CONCLUSION

By conducting validity and reliability tests for the contents of the questionnaire, it makes it easier for researchers to plan the course of research starting from data collection to statistical test of research results. In this study, the validity and reliability of the contents of the questionnaire were found to be very high in terms of the CVR and CVI values and Cronbach's alpha coefficient, so that later they would be able to produce good and quality scientific publication.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest whatsoever regarding the studies of this manuscript.

AUTHOR CONTRIBUTION

Kulsum Kulsum (KK) has collected and analysed the data. Taufik Suryadi (TS) wrote a publication manuscript. KK and TS both read and improved the manuscript. This manuscript has been approved by the authors.

5. REFERENCES

[1] Hui DS, I Azhar E, Madani TA, Ntoumi F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health. The latest 2019 novel coronavirus outbreak in Wuhan, China. Int J Infect Dis. 2020; 91:264–6.

[2] World Health Organization. WHO Coronavirus Disease (COVID-19) Dashboard. World Health Organization. 2020.

[3] Ministry of Health of the Republic of Indonesia. The COVID-19 situation. Jakarta. 2020.

[4] Mustakim M. The effectiveness of online learning using online media during the COVID-19 pandemic in mathematics. Al-Asma J Islamic Educ. 2020; 2 (1): 1–12.

[5] Ministry of Health of the Republic of Indonesia. Guidelines for organizing and fostering pesantren health posts. Jakarta. 2017.

[6] Ministry of Education and Culture of the Republic of Indonesia. Regulation Number 4 of 2020 concerning Implementation of Education Policies in an Emergency for the Spread of Coronavirus Disease (COVID-19). 2020; 1–3.

[7] Ministry of Education and Culture of the Republic of Indonesia. Regulation on Prevention of COVID-19 Outbreaks in Indonesian Education Units. 2020; 1–5.

[8] Hadiwidjaja S. (Thinking) Implementation of CBC in the Faculty of Medicine (Literature Study on CBC). Gaster J Health Sciences [Internet]. 2011; 8 (2): 721–30. Available from: http://jurnal.stikes-aisyiyah.ac.id/index.php/gaster/article/view/23

[9] Solviana MD. Utilization of educational technology during the COVID-19 pandemic: The use of online gamification features at the University of Muhammadiyah Pringsewu, Lampung. Al-Jahiz J Biol Educ Res. 2020; 1 (1): 1–14.

[10] Kusuma A. In learning. Educator's Lantern. 2011; 14: 35–51.

[11] Arbaugh JB, Benbunan-Fich R. The importance of participant interaction in online environments. Decis Support Syst. 2007; 43(3):853–65.

[12] Arbaugh JB. Sage, guide, both, or even more? An examination of instructor activity in online MBA courses. Comput Educ [Internet]. 2010; 55(3):1234–44. Available from: http://dx.doi.org/10.1016/j.compedu.2010.05.020

[13] Sun P, Tsai RJ, Finger G, Chen Y, Yeh D. What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. 2008; 50:1183–202.

[14] Eom SB, Ashill N. The Determinants of students' perceived learning outcomes and satisfaction in University Online Education: an Update*. Decis Sci J Innov Educ. 2016; 14(2):185–215.

[15] Richardson JC, Swan K. Examining social presence in online courses in relation to students'. 2003; (March).

[16] Arbaugh JB. Managing the on-line classroom. A study of technological and behavioral characteristics of web-based MBA courses. J High Technol Manag Res. 2002; 13(2):203–23.

[17] Hong KS. Relationships between students' and instructional variables with satisfaction and learning from a Web-based course. Internet High Educ. 2002; 5(3):267–81.

[18] Piccoli G, Ahmed R, Ives B. Web base virtual learning environment. Piccoli.pdf. 2001: 402–4.

[19] Yusoff MSB. ABC of content validation and content validity index calculation.

Education in Medical Journal. 2009; 11(2): 49-54.

[20] Cabatan MCC, Grajo LN, Sana EA. Development and content validation of the adaptation process in academia questionnaire for occupational therapy educators. Acta Medica Philipina. 2020; 54(2), 142-50.

[21] Rodrigues IB, Adachi JD, Beattie KA, MacDermid JC. Development and validation of a new tool to measurethe facilitators, barriers and preferences to exercise in people with osteoporosis. BMC Musculoskeletal Disorders. 2017: 18(504): 1-9.

[22] Zamanzadeh V, Ghahramanian A, Rassaoli M, Abbaszadeh A, Majd HA, Nikanfar AR. Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. Journal of Caring Sciences. 2015; 4(2): 165-78.

[23] Yusup F. Test the validity and reliability of quantitative research instruments. Tarbiyah Journal: Journal of education science. 2018; 7(1): 17-23.

[24] Masuwai A, Tajudin NM, Saad NS. Evaluating the face and content validity of teaching and learning guiding principles instrument (TLGPI): a perspective study of Malaysia teacher educators. Malaysian J Society and Space. 2016; 12, issue 3: 11-21.

[25] Amaya MA, Paixao DPSS, Sarquis LMM, Cruz EDA. Construction and content validation of checklist for patient safety in emergency care. Rev Gaucha Enferm, 2016; 37 (spe): 1-8.

[26] Hendryadi H. Content validity: Initial stage of questionnaire development. Journal of Management and Business Research. 2017; 2(2): 169-78.

[27] Ayre C, Scally AJ Critical value for Lawshe's content validity ratio: Revisiting the original methods of calculation. Measurement and Evaluation in Counseling and Development. 2014; 47(1): 79-86.

[28] Bashooir K, Supahar S. The validity and reliability of the STEM-based science literacy performance assessment instrument. Journal of educational research and evaluation. 2018; 22(2): 219-22.

[29] Wilson FR, Pan W, Schumsky DA. Recalculation of the critical values for Lawshe's content validity ratio. Measurement and Evaluation in Counseling and Development. 2012; XX(X): 1-14.

Appendix:

Reliability test

Case Processing Summary

		N	%
Cases	Valid	10	100.0
	Excludedᵃ	0	.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.912	48

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
No_1	148.80	344.400	-.096	.915
No_2	149.30	342.456	-.021	.913
No_3	149.40	342.933	-.046	.913
No_4	148.60	326.933	.372	.911
No_5	148.90	328.322	.561	.909
No_6	148.50	326.056	.858	.908
No_7	149.20	338.844	.074	.914
No_8	148.40	332.711	.485	.910
No_9	149.80	342.844	-.040	.915
No_10	149.40	346.489	-.155	.916
No_11	148.10	333.433	.368	.911
No_12	148.70	324.678	.599	.908
No_13	148.80	303.956	.818	.904
No_14	149.80	325.733	.435	.910
No_15	148.90	320.767	.489	.909
No_16	147.80	311.289	.856	.905
No_17	148.60	316.267	.599	.908
No_18	147.90	321.433	.691	.907
No_19	148.30	318.456	.769	.906
No_20	148.80	319.511	.704	.907
No_21	148.70	317.122	.656	.907
No_22	148.40	314.489	.780	.906
No_23	148.80	307.511	.871	.904
No_24	148.60	318.489	.788	.906
No_25	148.50	305.389	.799	.904
No_26	148.90	312.544	.697	.906
No_27	149.60	339.600	.140	.912
No_28	149.00	324.222	.550	.909
No_29	148.90	320.544	.722	.907
No_30	148.90	331.433	.621	.909
No_31	148.80	320.622	.801	.907
No_32	148.40	327.600	.347	.911
No_33	149.70	328.011	.354	.911
No_34	148.50	318.944	.650	.907
No_35	148.90	322.544	.652	.908
No_36	147.10	328.989	.564	.909
No_37	148.70	334.233	.259	.912
No_38	148.70	320.456	.752	.907
No_39	148.30	326.233	.618	.908
No_40	148.20	316.178	.748	.906
No_41	147.60	339.378	.100	.913
No_42	148.00	353.333	-.321	.919
No_43	148.20	357.956	-.387	.921
No_44	148.90	356.544	-.424	.919
No_45	148.20	348.622	-.227	.916
No_46	149.10	340.544	.103	.912
No_47	150.20	349.733	-.312	.916
No_48	149.50	334.722	.278	.911