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Pre-Service TVET Teachers' Readiness to Apply Entrepreneurial Elements: Instrument Content Validity using Content Validity Index (CVI)

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Abstract: The transformation in education requires pre-service TVET teachers to be prepared with entrepreneurial elements that can enhance their resilience. The pre-service TVET teachers' readiness to apply entrepreneurial elements in their field of study needs to be assessed. Therefore, an instrument needs to be identified and evaluated to measure the readiness to apply entrepreneurial elements among pre-service TVET teachers. The content validity is a necessary method to assess an instrument's suitability as an effective measuring tool. This study will use the Content Validity Index (CVI) method to assess the content validity of an adapted instrument. The evaluated instrument contains 15 items based on three domains. A total of eight panel experts were selected through purposive sampling to participate in this study. The panel experts consisted of five professional experts in psychometrics, assessment, educational psychology, languages, and entrepreneurship and three lay experts who are practitioners in applying entrepreneurial elements in their respective professional fields. The findings show that the adapted instrument has relevant content validity and potentially can measure the readiness to apply entrepreneurial elements among pre-service TVET teachers.

Keywords: Content Validity Index (CVI), Readiness to apply, Entrepreneurship, Pre-service TVET teachers

1. Introduction

Pre-service Technical and Vocational Education and Training (TVET) teachers' readiness to implement recommended educational practices is a crucial factor in determining the success of teacher education curriculum. Among the curriculum that being emphasized in Teacher Education Institute (IPG) is the application of entrepreneurial elements among pre-service TVET teachers (Institut Pendidikan Guru Malaysia, 2022). All IPGs pre-service TVET teachers learn the elements of entrepreneurship through the application method in IPG. The application of the entrepreneurial element can be implemented in courses either with a strained approach if the teaching activities clearly revolve around the entrepreneurial element, or an integration approach in any teaching process if the teaching activities do not clearly discuss the entrepreneurial element, or the application at the end of the teaching session by linking the learning outcomes with the actual entrepreneurial situation (Kementerian Pendidikan Malaysia, 2019). Any courses at IPG that contain entrepreneurial elements will contribute readiness to apply entrepreneurial elements among pre-service TVET teachers.

However, a report by Global Entrepreneurship Monitor (GEM) (2022) shows that more than 75 percent of teachers are not ready to apply entrepreneurial elements in their respective fields of specialization. GEM experts assessed that the level of implementation of the entrepreneurial element was very low, which was a score of below 5 out of a maximum score of 10 for 90 percent of the monitored countries. The global problem has also been detected in IPG pre-service teachers who lack readiness in the application of entrepreneurial elements in their fields of study (Ibrahim et al., 2019; Hassan et al., 2020; Thomson et al., 2021). Therefore, the readiness of pre-service TVET teachers in the application of entrepreneurial elements must be evaluated objectively. The existence of readiness will ease pre-service TVET teachers in applying entrepreneurial values in their field of study and increase their resilience.

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The readiness of pre-service TVET teachers to apply entrepreneurial elements needs special attention. Their high readiness will enhance quality and meaningful application process. This statement coincides with the study of Deveci and Seikkula-Leino (2018) and Njati (2020) which stated that the application of sustainable entrepreneurial elements should start at the teacher training stage regardless of the pre-service teachers' field of study. Pre-service teachers who are exposed to entrepreneurial elements will think and act innovatively (Njati, 2020) which can provide guidance and become role models for pupils in their actions. To ensure the well occurrence of entrepreneurial elements application, pre-service TVET teachers need to have a good level of readiness fostered through training or courses so that they have the right knowledge, skills and attitudes in spreading entrepreneurial elements. According to Faizu and Othman (2020), entrepreneurship is a discipline that can be learned by everyone, including pre-service TVET teachers.

According to the theory of planned behaviour (Ajzen, 1991), the determinants of an individual's readiness and intention to practice certain behaviours are attitudes, subjective norms and perceived behaviour control. Meanwhile, Nawi and Othman (2019) discussed teachers' readiness as readiness in terms of knowledge, skills and motivation which has a high influence on professional development and affects work culture and teaching effectiveness. Therefore, Olorode et al. (2021) and Dorji (2021) recommend pre-service teachers equip themselves with knowledge, skills, and motivation to be ready to apply entrepreneurial elements more effectively. Therefore, pre-service teachers need to master knowledge and skills that are needed in their field of study and professional development. Therefore, the readiness to apply entrepreneurial elements among pre-service TVET teachers should be assessed using relevant instruments that have been verified by content experts.

Based on the importance of readiness to apply entrepreneurial elements among pre-service teachers, current study aims to evaluate instrument validity to measure pre-service TVET teachers' readiness to apply entrepreneurial elements. The instrument validity assessment process will be carried out accordingly. Hence, an instrument that comply with content validity that only be used to assess the pre-service TVET teachers' readiness. The content of the instrument should objectively measure the readiness of the pre-service TVET teachers to apply the entrepreneurial element. This study will focus on the process of content validity testing for adapted instruments aligned with current study context using Content Validity Index (CVI) method.

The CVI method is based on the experts assessment of the relevancy of items in measuring a construct. Polit et al. (2007) have compared CVI with other alternative indices and concluded that the widely used CVI has advantages due to its simple, easy-to-understand calculation method, focus on consensus suitability rather than consensus alone, focus on consensus rather than consistency, and demonstrate the validity of each item individually and the scale or instrument as a whole. Meanwhile, one drawback of CVI is its weakness in adapting consensus among the experts involved. However, Polit et al. (2007) solved this issue of approval by calculating the item-ranked CVI (I-CVI) to the modified kappa statistical value. The calculations result of Polit et al. (2007) suggested that items with an I-CVI of 0.78 or higher for three or more experts can be considered evidence of good content validity. This study is focused more on how CVI can ensure that each item in the instrument accurately reflects the elements of readiness to apply entrepreneurial elements for pre-service TVET teachers in their field of study. Therefore, this study aims to evaluate the content validity of an instrument to measure the readiness to apply entrepreneurial elements for pre-service TVET teachers in IPG.

2. Literature Review

2.1 Readiness To Apply Entrepreneurial Elements

The current educations' challenges require teachers to be prepared with an entrepreneurial element to increase resiliency among teachers (Apak & Taat, 2018; Neto et al., 2017; 2019). Meanwhile, according to Ali and Buang (2019) and Salleh et al. (2017), a high readiness with entrepreneurial elements can be a guidance for teachers to act accordingly. They will not be distracted by implementation of new policy or uncertain situations at the expend of the profession's enjoyment. Therefore, teachers who possess readiness to apply entrepreneurial elements will be able to absorb stress and increase resilience (Razak & Kutty, 2021; Salleh et al., 2017), because they could face things creatively and innovatively. In addition, teachers' readiness with entrepreneurial elements would be able to produce something new based on current needs (Zulfikri, 2021). Thus, readiness will guide the teachers or pre-service teachers on taking relevant decisions and actions in various situations.

Meanwhile, Ali dan Buang (2019) found that pre-service teachers who are ready to implement a curriculum will have a positive attitude towards their task while pre-service teachers who are not prepared will show a negative attitude. According to Nasir dan Safran (2014), pre-service teachers who have high entrepreneurial characteristics are seen to have a positive attitude in carrying out a task and indirectly contribute to their readiness to integrate entrepreneurial elements in their field of study. This readiness can be influenced by a number of factors such as maturity, motivation, interests, basic skills and knowledge through experience or knowledge acquisition through relevant training (Ali & Buang, 2018). Thus, readiness will create confidence and form a positive attitude towards the task to be carried out among pre-service TVET teachers.

The government's efforts to cultivate entrepreneurship culture through higher learning institutes and government agencies in promoting entrepreneurship among students and community (Kementerian Pengajian Tinggi, 2020) should

be appreciated. However, the effort is more effective with multiplier effect when the pre-service TVET teachers are prepared with the entrepreneurial elements. The reason is teachers are the social role model for pupils and community, when entrepreneurship becomes culture among teachers, it would be easier to disseminate the culture to pupil and community. The early and continuous education to form entrepreneurial culture is more impactful (Seikkula-Leino et al., 2021; Koyuncuoglu & Aydogmus, 2021) to post-graduate education and training. This would be economical for the government with worthwhile return on investment to train entrepreneurs with entrepreneurship readiness, as compared to provide training and guiding entrepreneurs who do not possess entrepreneurial characteristics. According to Aluyor dan Otoikhian (2021), it is easier to guide and train entrepreneurs who have awareness and have an entrepreneurial personality.

The success on enhancing entrepreneurship culture is influenced by the readiness to apply entrepreneurial elements among pre-service TVET teachers who have been trained in IPG. If pre-service teachers possess the readiness to apply entrepreneurial elements, they will be able to apply entrepreneurial elements in their respective fields of study (Koyuncuoglu & Aydogmus, 2021). In addition, according to Kwesi (2022), pre-service teachers have creativity and innovative advantages in the application of entrepreneurial elements in line with the knowledge and skills fostered during training. These advantages must be utilized in tandem with the role of teachers as role models for entrepreneurial personality.

Pre-service TVET teachers need to use their knowledge and skills to make educational improvements through innovation and creativity. Therefore, they are not merely responsible for teaching content knowledge and providing guidance to students. The readiness of pre-service TVET teachers is one of the essential factors to help them applying what they have learned during training. If the pre-service teachers are not prepared, then all the standards and content designed by the policymakers will not be realized (Hassan et al., 2020). Among the domain to measure the level of pre-service TVET teachers' readiness to apply entrepreneurial elements is based on their knowledge, skills and motivation. Therefore, pre-service TVET teachers must have knowledge, skills, and positive motivation towards the entrepreneurial elements.

The findings of previous studies show the importance of readiness to apply entrepreneurial elements among pre-service TVET teachers. A study by Ali (2019) and Zulfikri (2021) shows that the readiness to apply entrepreneurial element is a reflection of the characteristics of individuals who possess knowledge, skills and motivation as well as the desire for an action. Therefore, current research used a questionnaire instrument adapted from Ali (2019) to assess the readiness to apply entrepreneurial elements by making several modifications based on the literature review which suits the study objectives. Therefore, the experts' assessment on the content validity of the adapted instrument needs to be carried out in accordance with the current context.

2.2 Content Validity Index (CVI)

The content validity approach based on Polit and Beck (2006) and Polit et al. (2007) is in accordance with the recommendation by Lynn (1986). The approach is by calculating two types of CVI, firstly involves the content validity of each item and secondly involves the content validity of the entire scale or instrument. According to Polit et al. (2007), there is a consensus on how to calculate the item-level CVI which referred to as I-CVI with the same score result. Otherwise, there are two calculation methods for scale-level CVI referred to as S-CVI for the purpose of differentiating between the two types of CVI. A panel of content experts will be asked to assess each item by providing an agreement scale on the item's conformity with the construct to be measured. Lynn (1986) recommends at least three experts and not more than 10 experts because the large number of experts does not contribute added value to CVI. Hence, the range between three to ten experts would be sufficient.

According to Polit and Beck (2006), researchers tend to use I-CVI scores to guide them in reviewing, improving, deleting or replacing items. However, in the reporting of studies, researchers usually do not provide information about the I-CVI score. On the other hand, the I-CVI values were only reported in methodological studies that focused on describing the content verification process. Polit et al. (2007) added that what is most frequently reported in scale or instrument development studies is the CVI for the entire instrument, hence it becomes difficult to be referred in the I-CVI context.

As for scale-level content validity, there are two approaches to calculating the S-CVI when there are more than two experts. Unfortunately, almost all scale developers never report the procedures they use (Polit & Beck, 2006). One approach is requiring consensus agreement among content experts on each item. Therefore, only items agreed upon by all experts will be accepted as items in a scale or instrument for measuring a construct. While items that are not agreed upon by consensus will be rejected or need improvement based on the disagrees expert feedback. Polit and Beck (2006) refer to this approach as S-CVI/UA (universal agreement).

Another approach to S-CVI is to calculate the average I-CVI of the entire item at a scale. This approach does not require consensus expert approval of an item to be accepted in scale. On the other hand, the overall minimum average of I-CVI with a value of 0.90 referred to as S-CVI/Ave will be accepted as a scale in measuring a construct. However, Polit and Beck (2006) found that authors of scale development studies almost never indicated the method or approach they used to calculate the S-CVI. Therefore, the gap in the writing and reporting a study needs to be clarified, especially since the S-CVI/UA and S-CVI/Ave approaches can produce very different values.

In conclusion, Polit and Beck (2006) and Polit et al. (2007) recommended for a scale to be evaluated as having excellent content validity, it should consist of items with an I-CVI value that meets the criteria of Lynn (1986) that suggested I-CVI equal to 1.00 for the evaluation by 3 to 5 experts and a minimum I-CVI value of 0.78 for 6 to 10 experts or preferably 0.83 or above (Yusoff, 2019). Meanwhile, a fair value for S-CVI/Ave is at least 0.90.

3. Methodology

This study uses a quantitative approach with a survey method using a questionnaire instrument. This study was approved by the Jawatankuasa Etika Penyelidikan (Manusia) JEPeM (Human Research Ethics Committee-HREC) (approval no. USM/JEPeM/PP/23090724) at Universiti Sains Malaysia (USM) on March 22, 2024. Respondents gave written consent for review and signature before starting answering questionnaire. Two categories of experts, namely professional experts and lay experts were selected using purposive sampling, where experts were selected based on their qualifications, experience, and suitability for the subject being studied (Bougie & Sekaran, 2020). Therefore, purposive sampling is the best method to ensure that the samples suit their ability and expertise in assessing and verifying the content of the items to achieve the objectives of the study. Some researchers have stated the validity of an instrument as measuring what should be measured (Cohen et al., 2018), means using the right measuring tool to achieve a specific objective. Therefore, the selected sample must have expertise in determining whether the items really measure within the study context.

The instrument on the readiness to apply entrepreneurial element was adapted from the instrument by Ali (2019) which measured the readiness to apply entrepreneurial element among IPG lecturers. The instrument was also adapted by Zulfikri (2021) in her study to assess the level of readiness to apply entrepreneurial element for pre-school teachers. The research instrument is based on three dimensions of readiness, namely readiness of knowledge, readiness of skills, and readiness of motivation in applying entrepreneurial elements. Each dimension contains items to measure the respondents' agreement using a 5-point Likert scale for each statement regarding the readiness to apply entrepreneurial elements. However, the modification of the item statement needs to be done to suit the context of this study, which is to study IPG pre-service TVET teachers. Therefore, the content validity of the instrument should be carried out by referring to the appropriate content expert.

The main aspect of validity in conducting quantitative studies is content validity. The basic approach to determining content validity of an instrument is to obtain feedback from experts in the field related to the study to be carried out (Ary et al., 2019). The expert will assess the suitability of the items content in the instrument based on the respondents who will answer the questionnaire, the difficulty level of the item's statement to be understood, and suit with the study objectives being conducted. An instrument with high validity is when the instrument can actually measure what is being studied (Creswell & Creswell, 2018). In this study, the method used is to determine content validity of the items in instrument to measure the readiness to apply entrepreneurial elements by referring to professional experts in various fields and lay experts. The content validity of each item and scale or instrument should be assessed by between three to 10 experts as suggested by Polit et al. (2007) or between six to 10 experts (Yusoff, 2019).

The instrument questionnaire was distributed through email after obtaining the experts' consent and their readiness to become respondent for the assessment of content validity of this study. Using CVI method in determining content validity of an instrument, each expert will make an assessment for each item in the questionnaire based on four scales, namely (1) not relevant (2) somewhat relevant (3) quite relevant (4) highly relevant (Polit et al., 2007). The collection of expert feedback based on the scale is to facilitate the researcher to categorize the items whether they are accepted or not accepted by the expert, namely scales 1 and 2 as unacceptable and scales 3 and 4 as accepted by the expert. Experts are also asked to assess the suitability of the item's content for the construct, the language used, the order in which the items are presented, and the suitability of the measurement with the aspects that need to be measured. Suggestions for modification and refinement of the questionnaire are also needed in case the expert is confused or dissatisfied with any of the items.

Next, the results of the overall assessment of the expert in the form of scale will be analyzed using the CVI method. Each scale given by an expert will be categorized into accepted items and non-accepted items, based on a choice of scales ranging from 1 to 4 (Polit et al., 2007). Scales 1 and 2 will be categorized as unacceptable items or rejected items with a value of "0" while scales 3 and 4 are categorized as items accepted by experts and rated "1" so that they can be analyzed using the Content Validity Index (CVI) method as proposed by Polit et al. (2007). Based on the CVI method, the validity can be determined by calculating the value of I-CVI for the item and calculating the value of S-CVI/Ave for the instrument. The method of calculating I-CVI is by summing the expert agreement on an item and dividing it by the number of experts (I-CVI = Total expert agreement on item-x / total number of experts).

$$\text{I-CVI} = \frac{\text{Total expert agreement on item}}{\text{Total number of experts}}$$

While the calculation of S-CVI/Ave is by summing up the I-CVI score and dividing it by the total number of items in each construct (S-CVI/Ave = Total I-CVI Score / Total items in construct-x).

$$\text{S-CVI/Ave} = \frac{\text{Total I-CVI Score}}{\text{Total number of items}}$$

For the I-CVI, the content validity of each item is based on the threshold value proposed by Lynn (1986) and Polit et al. (2007) which is 0.78 or higher for a total of eight experts, while Yusoff (2019) proposes a threshold value of 0.83. Meanwhile, for S-CVI/Ave, the threshold value is at least 0.90 as proposed by Polit et al. (2007) and Lynn (1986).

4. Results and Discussion

A total of eight experts were appointed for the purpose of verifying the content validity of the instrument. The selection of these experts is based on their experience and expertise in their respective fields and all experts have doctoral degrees (PhD). The experts consisted of five professional experts in psychometric assessment, educational psychology, language, and entrepreneurship and three lay experts who were lecturers as practitioners of the application of entrepreneurial elements in their respective professional fields. The response rate received from all professional and lay experts is 100 percent. All panels of experts (professional and lay experts) complete their assessments within the time frame. A list of expert information with areas of expertise and years of experience is shown in Table 1.

Table 1: Information of Content Validity Experts

Expert	Specialization / Expertise	Work experience	Name of Institution	Specialty Category
1	Entrepreneurship / Islamic Entrepreneurship	17 Years	Universiti Utara Malaysia (UUM)	Professional Expert
2	Entrepreneurship (TVET) and Business Administration	19 Years	IPG Kampus Sultan Abdul Halim (IPGKSAH)	Professional Expert
3	Ethics and Religion / Educational Psychology	17 Years	Universiti Teknologi Mara (UiTM)	Professional Expert
4	Development of Social Instruments / SEM (PLS/Amos)	18 Years	Universiti Kebangsaan Malaysia (UKM)	Professional Expert
5	Language / Quantitative Studies	23 Years	IPG Kampus Sarawak	Professional Expert
6	Entrepreneurship Education and Program Evaluation	32 Years	Universiti Kebangsaan Malaysia (UKM)	Lay Expert
7	Teacher Pedagogy / Smart-PLS	22 Years	IPG Kampus Sultan Mizan (IPGKSM)	Lay Expert
8	Application of Values in Education / Quantitative Studies	19 Years	IPG Kampus Darul Aman (IPGKDA)	Lay Expert

A total of five professional expert panels are academics who serve as lecturers of HEIs and IPGs with various specialties and are involved in research in the field of education. Meanwhile, three lay expert panels are lecturers who are directly involved in the process of implementing entrepreneurial elements in HEIs and IPGs.

The results of the content expert feedback are summarized in Table 2. Table 2 lists the item statements, the number of experts who accepted or agreed with the item statements, the I-CVI values for each item, and the actions taken based on the I-CVI values and expert comments on whether the items were accepted by retaining the original or modified statements or were dropped. The S-CVI/Ave values are shown in the last row in table 2.

Table 2: Content Validation with I-CVI and S-CVI Analysis for Readiness to Apply Entrepreneurial Elements

Item	Item statement	Number of experts accepted	I-CVI Value	Actions (Accept/Retain/ Modify/ Drop)
RD1	I am ready to have knowledge in life management.	8	1.00	Accept / Modify
RD2	I am ready to practice an excellent mindset to perform my duties.	8	1.00	Accept / Retain
RD3	I have a willingness to use all sources of knowledge.	7	0.88	Accept / Modify
RD4	I am ready to provide information on enquiries about entrepreneurship in my field of study.	8	1.00	Accept / Retain
RD5	I am ready for discussion in completing assignments.	8	1.00	Accept / Retain
RD6	I am ready to practice good financial management in my life.	7	0.88	Accept / Retain
RD7	I am ready to ensure that there is no wastage of resources.	7	0.88	Accept / Retain
RD8	I have a willingness to share how to be efficient in spending.	8	1.00	Accept / Retain
RD9	I am willing to solve problems by practicing entrepreneurial skills.	8	1.00	Accept / Retain
RD10	I often innovate to perform tasks excellently.	8	1.00	Accept / Modify
RD11	I have the desire to do challenging tasks.	8	1.00	Accept / Retain
RD12	I am ready to carry out a task with pleasure.	8	1.00	Accept / Modify
RD13	I am often ready to do assignments with entrepreneurial characteristics.	8	1.00	Accept / Retain
RD14	I always practice the work as ibadah (good practice).	8	1.00	Accept / Retain
RD15	I am willing to carry out my duties without expecting praise.	8	1.00	Accept / Retain
		S-CVI/Ave	**0.98**	

Referring to Table 2, all items were accepted because the I-CVI value of the items exceeded the threshold value of 0.78 (Polit et al., 2007; Lynn, 1986). However, statements for four items are being modified based on expert suggestions and comments. The modification involves item RD1 to "I am ready with entrepreneurial knowledge that is appropriate to my field of study (specialisation)", item RD3 to "I am ready with knowledge in creativity to produce a product", item RD10 to "I often innovate to perform tasks better", and item RD12 to "I am ready to carry out my tasks willingly". Therefore, all 15 items were accepted based on the CVI analysis as no items were dropped. Meanwhile, the average value of S-CVI/Ave for the entire instrument for the readiness to apply entrepreneurial elements construct was 0.98, above the threshold value of 0.90. Hence, this instrument is suitable to be used to measure the construct.

In summary, the S-CVI/Ave value for the instrument of readiness to apply entrepreneurial element is 0.98, exceeding the threshold value of 0.90. Therefore, adapted instruments that have gone through the process of expert validation and modification can move on to the next stage in a quantitative study, namely a pre-study and a pilot study to evaluate internal consistency, convergent and discriminant validity as well as evaluate the reliability of the instrument. The updated instruments after validation by experts are arranged by sequential numbers for each domain in the construct

5. Conclusions and Recommendations

This study shows content validity analysis using CVI method as a significant step in instrument adaptation. The researcher was guided by Yusoff (2019) study on steps to implement content validity using CVI method based on Polit et al. (2007) and Polit and Beck (2006) studies in interpreting the values of I-CVI and S-CVI/Ave. The items of current study being reviewed and evaluated by eight expert panels who gave comments and suggestions of improvement for ambiguous items. The content validity for instrument of readiness to apply entrepreneurial elements is reasonable and acceptable. According to the I-CVI score calculated for the 15 items, all items were accepted. The Items are accepted either with original statements retained or statements modified based on expert recommendations. The CVI method is an alternative measurement tool other than the CVR (Content Validity Ratio) method, FDM (Fuzzy Delphi Method), NGT (Nominal Group Technique) or any method that measures expert agreement using statistical analysis.

Even CVI shows items relevancy, a thorough analysis of the position of psychometric tests as a measurement tool is still needed. Therefore, future studies should support proper validity analysis of each instrument to improve the

usability of measurement instruments. Hence, the pre-study and pilot study will utilize an updated expert-endorsed version of the instrument. Then, further test on validity and reliability of the items with relevant statistical analysis after data collection would be meaningful. Therefore, by showing the content validity for the instrument of readiness to apply entrepreneurial elements using the CVI method, has added to the body of knowledge on instrument validity before further steps being carried out. The way forward, further analysis and studies are proposed using validated instruments to evaluate the relationship and influence between predictors that influence the readiness to apply entrepreneurial elements.

In conclusion, the objective of this study has been achieved to identify the content validity of the instrument of readiness to apply entrepreneurial elements among pre-service TVET teachers. Based on eight content experts' response consisting of professional and lay experts, all items exceeded the minimum value of item's acceptance I-CVI=0.78. Therefore, all 15 items for the instrument of readiness to apply entrepreneurial elements were accepted with the S-CVI/Ave reaching the value of 0.98 which is above the threshold value of 0.90 for an instrument to be accepted as having content validity.

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