INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 12, Issue 6, (2022) E-ISSN: 2222-6990

Development of Creativity Instrument for Technical Education and Vocational Training Students

Abd Rahman Wahab, Mohd Sukri Saud & Yusri Kamin

Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v12-i6/13894 DOI:10.6007/IJARBSS/v12-i6/13894

Published Date: *17* June 2022

Abstract

The purpose of this study is to develop an instrument of student creativity element by exploring creativity constructs for the formation of TVET student creativity instrument. The absence of creativity research affects Institutions of Higher Learning (HEIs) in improving the employability of graduates and preparing students for the workplace in an ever-changing industry.This study uses a qualitative approach through interviews as a case study method. The qualitative data analysis process was based on 3 stages of data processing by Miles and Huberman (1994) and NVIVO 12 Plus software was used to analyze the interview transcripts to form themes and subthemes. The qualitative data analysis identified eight elements related to the relevant elements of creativity, namely: intelligence, knowledge, thinking style, personality, motivation, environment, generic/soft skills, and mind mechanisms. Of the 8 constructs that emerged, they formed 24 dimensions. The implication of this study is to identify the elements needed to enhance the creativity of TVET students from the experts' point of view. Further study is to use survey method to see the level of creativity of TVET students by using the instruments that have been produced.

Keywords: Elements of Creativity, TVET Students, Intelligence, Environment, Personality and Motivation.

Introduction to the Importance of Creativity in TVET and Industry

Most organizations or industries seek employees who can plan resources holistically and increase organizational productivity. Nasyitah et al (2017) found that organizations usually provide tests to candidates who want to be hired with some form of testing to ensure that they have high creativity. The main purpose of the selection test is to find out the candidate's relevance and ability to find a solution to a particular case study. Therefore, the candidate's propensity of the candidate to be hired is assessed based on their ability and excellence in performing a particular case study. The organization will also evaluate and considers each answer submitted response to estimate the cost, energy, time and amount of human capital required to solve the problem. Creative individuals tend to be selected as

employees compared to less creative ones (Khayati et al., 2016). This is because creative employees in particular, who have a high level of thinking ability and are able to solve problems competently, will be the organization's first choice. In addition to the ability to think, organizations also see long-term goals as contributing not only to professional and individual development, but also to the global direction of the organization (Bekri, 2017).

In employment, individuals must bring the concept of creativity to the organization as they work (Brostrand, 2016). Through the intellectual power and creativity of employees, it is tried to make some action plans and development plans for work models to see the starting point of the advantages and disadvantages of each planned model. This is because, organizations need flexible planning where it must be designed and developed by employees with high creativity. Flexible planning also is usually done to avoid losses and promote usability and holisticness in organizations (Brostrand, 2016). The mindset of a person with high creativity adapts more easily to the environment and tends to evaluate the impact and implications of something that has happened. This ability to be creative is one of the most demanded skills in the job market (Krawjewski & Callahan, 2018).

Background Problem

Madar et al (2019) found that the study and use of international instruments in research related to TVET creativity in Malaysia has been very little done by previous researchers. In a study by Herpiana et al (2019) found that the main disadvantage of the widely used instruments related to creativity so far is that the assessments used tend to test more aspects of memory, while no assessments focusing on training students' thinking skills and creativity. Previous studies of existing creativity instruments have found that most revolve around only a few key areas, such as instruments that examine levels of creativity. The instrument developed by E. Paul Torrance pioneered the test for measuring individual creativity levels known as the 'Torrance Test of Creativity' (TTCT). Researchers often use four criteria of creativity such as Fluency, Flexibility, Originality and Elaboration as the main constructs. The lack of these instruments is that they only measure the level of individual creativity and only assesses creative products. Kim (2004), in his commentary on the TTCT, stated that this test does not assess all dimensions and even high level of competence on the TTCT does not guarantee that an individual is behaving creatively. Baer (2011) commented on the weakness of the TTCT in terms of domain specialization because the absence of one domain does not limit creative ability in another domain.

In addition to the creativity level instrument, the creativity factor instrument is also widely produced and used by researchers. Zulkifle et al (2020) have produced and used the instrument to conduct a study on the factors affecting creativity in polytechnic students and the results found that knowledge is the main factors of driving the creativity of students. The results of the study using this instrument are just a confirmation of the factors that drive creativity. Another instrument was used to study the relationship between constructs and creativity. The study by Fischer et al (2019) examined intrinsic motivations that can be used in organizations to promote employee creativity and innovation. Boroujerdi & Hasani (2017) conducted a study to investigate the relationship between teachers' thinking style and creativity. The research instruments created were adapted from Sternberg's model of thinking style and creativity. Overall, the research instruments used revealed a significant relationship between the factors studied and creativity. The drawback of their study is that it

only establishes the relationship of one factor or construct of creativity and ignores the other variables.

The studies of previous researchers are not specific to certain skills and a certain field of work. Razip et al (2013) developed an instrument to assess creative attitudes of physics students in full boarding schools. The results of the study are specific to only one construct, namely creative attitude or personality. The study of creativity factors, on the other hand, is only a confirmation of factors without a description of the most important elements in those factors. Zulkefli et al (2020) suggest that further research can be conducted on creativity, especially for technical college students, by using different study designs so that this element of creativity can be more thoroughly explored and understood.

Problem Statement

The results of the literature review showed that there is a lack of studies on creativity that combine the exploration and development of elements of creativity, especially in technical education and vocational education students. If they exist, most instruments are adopted and adapted from existing models from abroad (adopt & adapt). There are too few researchers developing models, frameworks, or tools for developing elements of student creativity by having them studied and validated by local creativity experts. Existing instruments were mostly developed to examine relationships, and most factors were developed based on Classical Test Theory (CTT) and use multidimensional research such as factor analysis.

Given the aforementioned problems and implications of the lack of instruments as stated, the study developed an instrument to enhance creativity of TVET students that includes the construction of Student Creativity Element Instrument which has creativity constructs obtained from industry experts and feedback. Based on the literature review also found that knowledge, thinking style, personality, motivation, environment, and intelligence are important variables for creativity of technical and vocational training (TVET) students in Malaysia.

Objectives and Research Questions

This study aims to develop an instrument of student creativity elements based on content analysis with the following research objectives:

- To explore creativity constructs for the formation of TVET student creativity instruments.

The aim of this study is to obtain answers to some of the questions formed. In order to achieve the first objective of the study, which is to explore the creativity construct in the formation of the creative character of TVET students, the following research questions need to be answered:

- What are the creativity constructs that enable TVET student creativity instruments to be built?
- What are the construct dimensions in constructing instruments?

Methodology

This research is a qualitative study using the expert interview method. A total of 5 experts, consisting of University, Polytechnic and Vocational College lecturers were identified as qualified interviewees based on their extensive experience in developing TVET students' creativity. The process of qualitative data analysis is based on 3 levels of data by Miles and Huberman (1994) which begin with data management, understanding and recognizing data and the production of themes and categories. NVIVO 12 Plus software is used to facilitate the process of analyzing interview data.

Findings and Discussion

Construct Formation

Table 1.1 shows a partial summary of the results of the interviews with five experts analyzed using NVIVO 12 Plus software. These excerpts are part of the findings from the interviews conducted with selected relevant experts. Full interviews are available for each construct dimension formation.

Table 1.1
Some Data Findings from Expert Interviews

Respondent	Transcript	Theme
R1	"I believe that motivation plays a role in increasing student creativity. We are strongly encouraging the involvement of students and lecturers in any creativity and innovation competitions."	Motivation
R4	"As for motivation, I see that every person has a high and a low. If we give that person some kind of "new power while he is down to motivate him, he will be positive again."	
R1	"Most importantly, students' creativity is shaped by the team spirit we build. This teamwork is built with activities like this."	Generic Skills
R2	"If you can solve the problem, I will allow you to work. That is all he has to do. This means, what they see is the credibility of a candidate solving a problem within an hour."	
R3	"Examples we can look at are the environment, the occurrence of pandemics, and global climate change. The recent international convention dealt with climate change and we need to focus on the current issues related to the environment and climate change."	Cleverness
R4	"Perception is what the student sees and hears in order to recognise a subject/thing as a whole, what exists now and what is in the future. This is what makes him more creative to find a solution and a quality result."	**Mind Mechanism**

The findings of the interview can be summarized by comparing the opinions of the respondents in Table 1.2. All of the experts commented on the lack of generic/soft skills elements in the students, while one of them thought that the mind mechanism element should be applied to the students in order to shape the creative character of the students.

The findings from the analysis of the interviews conducted with 5 experts related to the study confirmed the results of the document analysis conducted.

Table 1.2
Comparison of Expert -Based Creativity Elements.

No.	Creativity Elements	R1	R2	R3	R4	R5
1	Cleverness			x	x	
2	Personality		x	x		x
3	Knowledge	x	x			x
4	Thinking Style			x	x	
5	Motivation	x	x	x	x	x
6	Environment	x	x	x	x	x
7	Generic/Soft Skills	x	x	x	x	x
8	Mind Mechanism				x	

Overall, the findings of the interview analysis of the elements for constructing the SCi-TVET instrument are as follows:

i. Cleverness
ii. Personality
iii. Knowledge
iv. Thinking style
v. Motivation
vi. Environment
vii. Generic/Soft Skills
viii. Mind Mechanism

Therefore, the formation of these 8 elements of creativity for the construction of instruments can be continued after taking into account the findings of expert opinion.

Formation of Construct Dimensions

The element dimensions were formed after the key elements were identified and generated through the analysis of the interviews conducted. To form the element dimensions, data analysis was conducted by examining the relevant subthemes from the expert feedback in the interviews.

Personality Construct Dimension Data Findings

a. Expert Interview Findings

Table 1.3 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the theme of personality and its dimensions. Table 1.4 is a summary of the data findings for personality constructs and dimensions.

Table 1.3
Some Data Findings from Expert Interviews

Respondent	Transcript	Theme
R2	"This personality refers to several things, such as his nature as a risk taker. This risk taker is everything he wants to try, he does not think negatively, but only positively."	Risk
R3	"He must dare to try something and not be afraid of risk."	
R2	"From a personality point of view, it is not possible if you have creativity but you are not proactive. It does not seem to fit or be complete. If we have a lot of ideas but are not proactive, do not get involved to make something he does not become".	Proactive
R5	"In terms of the student personality, I value his attitude. If his attitude is toward learning, his interest and eagerness to learn no matter what, then it is easier for us to guide him."	Interest
R3	"The students I take to the international level in innovation competitions have a different self-confidence than other students."	Self confidence

Table 1.4
Summary of Personality Dimension Expert Interview Data Findings

No.	Personality Constructs	R1	R2	R3	R4	R5
1	Self confidence			**x**		
2	Interest					**x**
3	Proactive		**x**			
4	Risk		**x**	**x**		

Data Findings of Thinking Style Construct Dimensions

a. Expert Interview Findings

Table 1.5 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the context of the theme of thinking style and its dimensions. Table 1.6 is a summary of the data findings for the constructs and dimensions of thinking style.

Table 1.5
Expert Interview Data Findings

Respondent	Transcript	Theme
R3	"For example, we look at the surrounding communities to see if their jobs are like in Keningau, most of them are farmers. They grow vegetables and so on, which is suitable for hilly areas. In Keningau, it is a hilly area. From there, the student can consider how he or she can contribute with social innovations that help farmers increase their yields."	Analytical
R4	"Analytical thinking means he has to think deeply, in detail, indepth thinking. He can not think normally, he has to see something seems like he sees something new. In other words, you have to think outside the box."	
R4	"Open mind because he is biased for himself. He needs to exchange ideas and see a variety of things. Sometimes such an idea may be clear and understandable on his behalf. But in other people's perception, it may not fit. Therefore, he must be open to criticism and the ideas of others."	Positive

Table 1.6
Summary of the Findings of the Thinking Style Dimension Expert Interview Data

No.	Thinking Style Constructs	R1	R2	R3	R4	R5
1	Analytical			**x**	**x**	
2	Positive				**x**	

Intelligence Construct Dimension Data Findings

a. Expert Interview Findings

Table 1.7 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the theme of intelligence and its dimensions. Table 1.8 is a summary of the data findings for the constructs and dimensions of intelligence.

Table 1.7
Expert Interview Data Findings

Respondent	Transcript	Theme
R3	"Apart from that, we look at the current state of the industry or the world, which is changing. For example, we see that we need to focus on the environment, with its pandemics and climate change and that the recent international conventions on climate change need to focus on the current problems of the environment and climate change. When we solve problems, we need to prioritise and be sensitive to the preservation of the environment."	Sensitive
R4	"Next, students need to diligently explore what is happening around them and be attentive. The environment is not only to society but also to socioeconomics. If they produce something or have an idea, these factors will also contribute to creativity."	

Table 1.8
Summary of Intelligence Dimension Expert Interview Data Findings

No.	Concentrate of intelligence	R1	R2	R3	R4	R5
1	Sensitive			**x**	**x**	

Knowledge Construct Dimension Data Findings

a. Expert Interview Findings

Table 1.9 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the theme of knowledge and its dimensions. Table 1.10 is a summary of the data findings for the constructs and dimensions of knowledge.

Table 1.9
Expert Interview Data Findings

Respondent	Transcript	Theme
R1	"Of course, talent plays a role in these areas. We will polish their talents until they succeed. If the fashion students, in 6 months early every day they do sketching with a pencil until they master it."	Talent
R5	"As for intelligence, a student who can use both sides of the brain when thinking means he is a creative person. For example, an engineering student who is only good at one logical aspect, that is, using only the left side of his brain, is not creative. However, if that student can use both the left and right hemispheres of the brain well, he is creative."	
R2	"Knowledge is important because as they say, we want to make human capital experts in the field. If he does not have knowledge, he will not be an expert. Whatever field he chooses, we look at how he acquires the knowledge."	Facts
R2	"If he does not have knowledge, he will not be an expert. No matter what field he chooses, we will see how he acquires the science. After that, if we have enough knowledge, we identify ideas, we identify new basic science."	Technical skills
R5	"We have a demo program or our poly students, he teaches outsiders, whether it's the mothers' community or the school. Students need to think and get an activity where we can share skills with outsiders. So, for this event if the level is low, such as semester 1 or 2, he could go through drawing or illustration classes, he can come up with basic activities such as drawing, printing or silkprinting. For senior students, maybe they could go for advance classes like photography or rendering."	

Table 1.10
Summary of Knowledge Dimension Expert Interview Data Findings

No.	Science Constructs	R1	R2	R3	R4	R5
1	Talent	**x**				**x**
2	Technical skills		**x**			**x**
3	Facts		**x**			

Motivation Construct Dimension Data Findings

a. Expert Interview Findings

Table 1.11 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the theme of motivation and its dimensions. Table 1.12 is a summary of the data findings for the constructs and dimensions of motivation.

Table 1.11
Expert Interview Data Findings

Respondent	Transcript	Theme
R2	"This motivation can be personal or sometimes material. Importantly, we want to make sure that the support system takes both things into account. Are students concerned with personal interest or more material things such as incentives."	Rewards
R3	"Next, these students respond actively, usually we need to improve the project for the next competition. Active students understand and respond and are more proactive. They are more charismatic; they are more positive and optimistic."	Attitude
R1	"I believe that motivation plays a role in increasing students' creativity. We encourage the involvement of students and lecturers in creativity and innovation competitions. We have special funds for such activities. Last year, a team went to Moscow for an innovation competition and won a success for the country and KPT."	Appreciation
R3	"As for motivation, we always give recognition to students from KV. We use the concept of social media like a blog, so any information we upload to social media can be shared with other students and the surrounding community. Most of the Keningau community knows the success of our students through social media and that can motivate students who feel appreciated and admired."	
R4	"In terms of motivation, I see that everyone has a time when they are down. If we give that person some kind of "new power" to this individual while they are down to motivate them, then they will be positive again. Another example is when students give a presentation and we find the results less interesting, we motivate them by suggesting them to use new modern sources."	
R5	"At PIS, there are some of us who run programs to encourage student creativity, such as the Art Biz. This Art Biz is a supplement to the presentation of student work."	

Table 1.12
Summary of Motivational Dimension Expert Interview Data Findings

No.	Motivation Construct	R1	R2	R3	R4	R5
1	Rewards		**x**			
2	Appreciation	**x**		**x**	**x**	**x**
3	Attitude			**x**		

Dimensional Data Findings Construct Environment

a. Expert Interview Findings

Table 1.13 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the theme of the environment and its dimensions. Table 1.14 is a summary of the data findings for constructs and environmental dimensions.

Table 1.13
Expert Interview Data Findings

Respondent	Transcript	Theme
R5	"The environment is important, we have to have a diverse learning space, not just a classroom, we have a studio, a computer lab and other spaces that stimulate students' creativity. For example, we want to teach drawing class students, not necessarily in the classroom. We share that kind of environment to encourage their creativity in drawing. We are also bringing students into a more relaxed studio with a studio that has many sections."	Classroom
R2	"The most important thing for me is that the University or the institution itself cultivates the practice of creativity. Institutions need to aim to cultivate creativity as an example of innovation and creativity. It has an institutional goal that all support staff, lecturers and students must pursue."	Institutions
R5	"In terms of the organization or institution, what they do is encourage more in any common competition, whether financial or facilities. If the unit on campus, such as HEP and counseling, it will increase the motivation or self-development of students. I see activities like this, it does not mention that creativity is encouraged, but their program has problem solving activities, they get a task and solve the problem. As long as it is problem solving, students' creativity is encouraged. In the curriculum we also have a creative thinking course and a design thinking process elective course."	
R2	"Lecturers also need to pay attention to how they can foster innovation and creativity in their students."	Lecturer
R1	"In addition to problem solving, they will also learn how their environment helps increase their creativity. The influence of peers, lecturers and the environment around them is very helpful."	Peers
R5	"As for peer influence, it helps a lot with teamwork and group discussions. Then for a weak friend nominally a peer who has a lot of support compared to the lecturer."	
R1	"Now times have changed, technology has also evolved. MOHE must also cannot be left behind in the latest technological developments. The development of various	Technology

	software has to be aligned with our curriculum. So, we are trying to meet the needs of the industry by upgrading technological skills."	
R3	"The industry now needs innovations that reduce the workforce. So, students need to master technological change to meet the demands of the industry that is adopting the 4.0 industry revolution. We need to understand the role of technology in industry and business. Once students understand that role, they need to think creatively about how they can compete with technology and what they have that technology does not."	
R4	"The environment is not just in terms of society, but also from a socioeconomic standpoint. When they produce something or an idea, those factors also contribute to creativity. For example, if a student does not know about current technology, it's very difficult to produce something that really meets current needs."	

Table 1.14
Summary of Environmental Dimension Expert Interview Data Findings

Bil	Environmental Constructs	R1	R2	R3	R4	R5
1	Classroom/Lecture		**x**			
2	Peers	**x**				**x**
3	Lecturer			**x**		
4	Institutions		**x**			**x**
5	Technology	**x**		**x**	**x**	

Generic/Soft Skills Construct Dimension Data Findings

a. Expert Interview Findings

Table 1.15 shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the theme of generic/soft skills and their dimensions. Table 1.16 is a summary of the data findings for the constructs and dimensions of generic/soft skills.

Table 1.15
Expert Interview Data Findings

Respondent	Transcript	Theme
R1	"Most importantly, all these activities will educate and produce leadership elements for them. We will recognize their leadership talents by looking at how they successfully lead a particular project or not."	Leadership
R2	"Regarding generic skills apart from communication, there is another important element which is leadership. For example, if we want to move forward, we must have the nature of leadership. If we do not have the nature of leadership, we cannot move our group further. In addition, when we are in group there have interaction between ideas and ideas."	
R1	"In the field of design, we call players in the construction industry and show design students and house design models for their ideas. Indirectly, such activities help in many aspects such as communication, self-confidence and the development of their own potential."	**Communication**
R2	"Another element that I think is important is communication, which is not just verbal communication, but also visual communication."	
R3	"Next, his communication skills must be able to communicate well, answer questions well and explain clearly."	
R4	"The sixth point is good communication. He wants to communicate with people to say that he has an idea."	
R5	"In the generic skills element, there is also an element of creativity. Especially communication and teamwork. Both of these help in the development and expansion of ideas."	
R1	"In this activity, they also learn how to solve problems. If they do not use their creativity, the outcome will not be as good. They will identify problems, analyze them and make an evaluation of the rationales. In this way, the problem-solving process is done using the creativity they have."	Problem Solving
R2	"If you can solve the problem, I will take you to work. That's it, that's what he just did. Meaning what they see is the candidate's credibility to solve the problem in an hour. So, what we see is that the candidate, with his knowledge, is going to use every opportunity to solve the problem."	
R3	"For me, the element that needs to be emphasized is problem solving. When we talk about creativity, we need to know what creativity is, what innovation is.	Problem Solving

	We create something to solve a problem. Creativity is essential to the problem-solving process. We do not create something to have fun, to look good or to please ourselves, we create something to solve problems.”	
R3	"If in academia we can also promote creativity through project-based learning, and with this project, you become independent and there are many elements that you need to complete the project. It has elements such as art elements, communication elements, and technology elements and all the elements need to be combined when completing the project. This project is able to strengthen the students' ownership. In the allotted time, students must research and present the findings to solve the problem."	
R4	"The next step is the ability to obtain ideas/ add and develop ideas (dissect ideas). If he can process an idea through a creative process, then of course he already knows, this is A, this is B, and C. How can A, B and C have a concrete solution that must be combined with all three ideas or lead to one thing.".	
R4	" Manage (ability to plan) manage the idea, manage the result and he is able to plan the process from the beginning of creativity to the result. So, it is important how their ability to plan."	**Information management**
R1	" Most importantly, students' creativity is shaped by the team spirit we build. This teamwork is built with such activities. I'll take an example from teamwork: they will use their creativity to interact with each other, work together to achieve the group's goals, and they will play a role in building the confidence of the friends in the group to succeed.	Group Cooperation
R2	"In addition, the interaction between ideas and other ideas in the group will help to develop good creativity.	
R2	"People explain to us that they have a team work of students with lecturers to come up with this idea. The team really thinks for a year before the competition."	
R5	"In the generic skills element, there is also an element of creativity. Especially communication and teamwork. When both are present, it helps with developing and expanding ideas.	

Table 1.16
Summary of Expert Interview Data Findings on Generic/Soft Skills Construct Dimensions

Bil	Generic Skill Constructs	R1	R2	R3	R4	R5
1	Communication	x	x	x	x	x
2	Leadership	x	x			
3	Problem solving	x	x	x	x	
4	Information management				x	
5	Group Cooperation	x	x			x

Data Findings of Mind Mechanism Construct Dimension Data

a. Expert Interview Findings

Table 1.17 below shows excerpts from the findings of the interviews with the five experts. These excerpts are findings from interviews analyzed in the context of the theme of mind mechanisms and its dimensions. Table 1.18 is a summary of the data findings for the constructs and dimensions of mind mechanism.

Table 1. 17
Expert Interview Data Findings

Respondent	Transcript	Theme
R4	"Perception that students see and hear to recognize a subject/thing as a whole, what exists now and what is in the future. This is what makes him more creative to think of a solution and a quality result."	Perception

Table 1. 18
Summary of Expert Interview Data Findings of Mind Mechanism Construct Dimensions

Bil	Constructs of Mind Mechanisms	R1	R2	R3	R4	R5
1	Perception				x	

Conclusion

In the conclusion from the collection and analysis of the qualitative data, eight constructs were identified that relate to the relevant elements of creativity, namely: intelligence, knowledge, thinking style, personality, motivation, environment, generic/soft skills, and mind mechanisms. Of the 8 constructs that emerged, they formed 24 dimensions.

References

Baer, J. (2011). Four (more) arguments against the Torrance Tests. *Psychology of Aesthetics, Creativity, and the Arts* , *5* (4), 316–317. https://doi.org/10.1037/a0025211

Bekri, R. (2017). *E-Portfolio Indicator for Competency Assessment and Virtual Learning in Malays Skills Certification*. Journal for Technical and Vocational Education and Traning in Asia. 4, 1-14.

Boroujerdi, S. S., & Hasani, K. (2017). The survey thinking style and its relation with creativity in physical education teachers. *International Journal of Educational Management*, *28*(4), 400–412. https://doi.org/10.1108/IJEM-05-2013-0084

Brostrand, H. L. (2016). *Tilting at Windmills: Changing Attitudes toward People with Disabilities*. Journal of Rehabilitation. 72(1).

Herpiana, R., Rosidin, U., & Abdurrahman, A. (2019). Development of Instruments to Train Critical and Creative Thinking Skills in Physics Assessment for High School Students' Learning. In Journal of Physics: Conference Series (Vol. 1155). Institute of Physics Publishing. https://doi.org/10.1088/1742-6596/1155/1/012046

Fischer, C., Malycha, C. P., & Schafmann, E. (2019). The influence of intrinsic motivation and synergistic extrinsic motivators on creativity and innovation. *Frontiers in Psychology*, *10*(FEB). https: // doi.org /1 0.3389 / fpsyg.2019.00137

Kim, K. H. (2004). *Confirmatory factor analyses and multiple group analyses on the Torrance Tests of Creative Thinking*.Poster presented at the Research Symposium: The Preparation of Educators, Athens, GA. Sponsored by Georgia Systemic Teacher Education Program.

Madar, A. R., Sun, C. E., Hamid, H. (2019) Facilitating torrance test of creative thinking use in malaysian TVET research: The initial step offinter-rater reliability determination.*Journal of Technical Education and Training*, 11 (1), pp. 100-108

Razip, M. B., Seth, S., Ellany, L. M. (2013). Construction of Creative Attitude Instrument Among Form Four Physics Students of Johor State Boarding Schools. *2nd International Seminar on Quality and Affordable Education (ISQAE 2013) , 2012* (Isqae), 391–394.

Miles, M. B., & Huberman, A. M. (1994). Qualitative Data Analysis: An Expanded Sourcebook. Thousand Oaks, CA: Sage Publications.

Nasyitah, N. A., Balkhis, S. A., Nur Najihah, R., Mai, S. A., Nor, A. (2017). Human Science. 9 (5), 59–66.

Khayati, N. B., Isa, M. H., and Khadijah, A. R. (2017). Attitudes in Project -Based Learning towards Student Achievement at Perak Polytechnic. Articulation Ink Builds the Ummah. 3 (1), 1-14.

Zulkifli, N., Hamzah, M. I., & Abdul Razak, K. (2020). Creativity driving factors among polytechnic students. *Asian People Journal (APJ) , 3* (2), 77–85. https://doi.org/10.37231/apj.2020.3.