

Modified Nominal Group Technique (Ngt) and its Application to the Development of Elements in the Vocational College Standard Curriculum in the Field of Refrigerant and Air Conditioning (Vcsc_Rac) Based on Values to the Environment

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Abstract

This curriculum model is a value-based model of environmental sustainability built through the Vocational College Standard Curriculum of the Refrigeration and Air Conditioning (VCSC_RAC). Concerning that, this study proposes a Design Development Research (DDR) approach which is a multi-method development research approach. The study went through three phases and used several different research tools in each phase. The purpose of this study is to discuss the suitability of Modified NGT as a strategy to build a list of value elements for environmental sustainability through literature reading, discussion and votes to obtain the expert agreement in phase 2 of the design and development model. Only findings of phase 2 were discussed in this article. Researcher have distributed a list of developed elements for review by six experienced lecturers in the field of Refrigeration and Air Conditioning (RAC) to review and evaluate the elements and whether they can be accepted or rejected to be brought to the NGT process. A total of nine informants were involved in the NGT process, namely, experts from Vocational Colleges (VC), various educational institutions and industry sectors in the field of RAC as well as environmental experts from the Department of the Environmental (DOE), University of Putra Malaysia (UPM) and Teacher Education Institute (TEI) were involved in this NGT process. All these expertise have been selected and meet the set of criteria. The findings of the study indicated that 28 constructed value elements are accepted as components in the model development.

Keywords: Modified Nominal Group Technique (NGT), Model, Values, VCSC_RAC, Design and Development

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1. Introduction

Environmental Education refers to planned efforts made to educate the community either formally or otherwise so that the well-being and survival of the environment and the environment are preserved and sustainable (Haliza, 2017). Therefore, a value-based model for environmental sustainability in the Vocational College Standard Curriculum in the field of Refrigeration and Air Conditioning (VCSC_RAC) is being planned and developed by researchers as a planned effort to educate students in the field of Refrigeration and Air Conditioning (RAC). This paper is the second phase of the study where this phase is the design phase of value-based model development for environmental sustainability in VCSC_RAC. Overall, there are three phases in this study, namely the needs analysis phase, the design and development phase and the evaluation phase where the Development Design and Research approach or better known as DDR is used. The first phase using the survey method was carried out in all Vocational Colleges in the field of Refrigeration and Air Conditioning (VC_RAC) all around Malaysia representing all 38 VC_RAC found in Malaysia including Sabah and Sarawak. Findings have been analyzed using the Statistical Package for the Social Sciences (SPSS) Version 23.0 which involves two constructs namely the model content requirement construct (15 questions) and the model construction construct (10 questions) regarding the value of environmental sustainability. The results of the study show that the overall mean of the model content construct (mean value 4.5675, standard deviation .39074) and the model construction requirement construct (mean value 4.5413, standard deviation .42459) are very high.

The interview findings of three respondents are also very positive and support the construction of a value model for environmental sustainability. This can give a clear enough picture of the need for the construction of this model and it justifies that a model is developed to increase the value of environmental sustainability and then become an added value for RAC students to enter the world of work in the industrial sector later. The second phase involves the use of the Nominal Group Technique (NGT) and Interpretive Structural Modeling (ISM) approaches which require a group of field experts to decide through expert consensus. However, one of the procedures in ISM requires a group of experts to discuss ideas and issues to be presented. For that purpose, a modified Nominal Group Technique (NGT) was used to examine the issues that were raised next to verify the selected elements before the ISM process was carried out. However, before being brought to the NGT process, the researcher first builds a list of elements through a literature review and submits the list of elements to each experienced VC_RAC in Malaysia lecturer representative from each Zone which is the South, Central, North, East, Sabah and Sarawak Zones to review and verify the list of elements first before being brought to the NGT process. The usability evaluation phase of the model is the last in this study and will use the Fuzzy Delphi Method (FDM) technique in evaluating the perception and satisfaction of the implementers towards the model that has been developed. The following is a flowchart related to the method used in this study.

Table 1. Design & Development Research (DDR) Approach Flow Chart for Md Nizam Alam Sekitar (MNAS) Model Development

No	Research Objective	Research Question	Approach	Analysis
1	Explore the value elements of environmental sustainability that will be applied in the model.	What are the elements of value for environmental sustainability that will be applied in the model?	Questionnaire	Survey Analysis
2	Explore the value elements of environmental sustainability that will be applied in the model.	What are the elements of environmental sustainability value that will be applied in the model?	Interview	Interview Transcript
3	Develop MNAS model in VCSC_RAC ?	Is the MNAS model in VCSC_RAC compatible?	Questionnaire	<i>Nominal Group Technique (NGT) & Interpretive Structural Modelling (ISM)</i>
4	Evaluate the usability of the MNAS model in VCSC_RAC.	Is the MNAS model in VCSC_RAC appropriate?	Questionnaire	<i>Fuzzy Delphi Method</i>

2. Design and Development

To achieve a goal in the world of research, NGT is a decision-making process in the form of face-to-face small group discussions (Aizzat Mohd. Nasuridin, Intan Osman & Zainal Ariffin Ahmad, 2006) which is semi-quantitative and structured (O'Neil & Jackson, 1983); Dobbie, Rhodes, Tysinger, & Freeman, 2004; Perry & Linsley, 2006). NGT is semi-quantitative because it also incorporates qualitative methods in the design and development phases. This is because NGT starts with a qualitative method which is the process of 'acceptance of ideas without evaluation' which is then followed by a quantitative method which is the process of ranking or prioritizing ideas (O'Neil & Jackson, 1983). Many researchers have modified and adapted the NGT process to the studies to be conducted. However, the basic principle that is the backbone of the NGT process remains maintained where there are two main stages (1) identification of the issue of a problem through discussion; (2) voting process to get quick results. In addition, it is described that NGT requires the direct involvement of participants that is face-to-face or in workshops where participants are given equal opportunities to speak on all questions raised to have equal validity (Harvey and Holmes, 2012). In other words, it is an opinion to reach an agreement in making a decision. Next, to get ideas for the questions raised, it will happen in silence, without having to have a discussion with other participants or ask for an explanation from the researcher. This is to allow participants to produce their thoughts and ideas without interference or pressure from others, reducing dependence on other members who may not like to help and may affect the entire process (McMurray,

1994). Nevertheless, the researcher has chosen the method of sending a questionnaire in the form of a 7-point Likert scale to the experts via google form and through the whatsapp/telegram application since it was post-Covid-19 and the enforcement of the Movement Control Order (MCO) was still being implemented.

2.1 Nominal Group Technique (NGT) Modified

According to (Van de Den & Delbecq, 1971), NGT is a structured discussion of a small group to reach a consensus or agreement on an issue presented. The NGT technique is a popular technique and one of the effective techniques using structured group discussions (Duggan et al. 2004; Dowling et al. 2000). Meanwhile, Dang (2015) stated that there are two main processes in the NGT technique, namely the group discussion and the voting phase. He added, it is to produce semi-quantitative data and the format is used to encourage a meaningful experience and interpersonal exposure among participants in reaching a consensus. In addition, the NGT technique is very suitable for studies that require agreement and evaluation because the NGT technique can produce a high consensus. In retrospect, NGT was originally used by Van de Den and Delbecq (1971) as a tool to help disadvantaged communities in a community living environment. Now, the use of NGT techniques not only saves time but can also help researchers get accurate and precise views because the respondents express their views through questionnaires that are not influenced by any party (Habibah et. Al., 2018). Despite that, according to the recent passage of time NGT modification is very popular and relevant to be carried out because it saves time and energy because researchers first develop elements through a literature review. So, there is no need for a long discussion process to develop an element. In the post-Covid-19 that started and hit the world around 2020 and the implementation of the MCO at that time, the NGT method is also identified as an interview technique where the participants are met in a goggle meet and they express their views freely in oral form.

3. Values for Environmental Sustainability

In the context of this study, researchers see the need to emphasize the value aspect of environmental sustainability in VCSC_RAC. This element of value should be at the core of human capital development even if it is seen as a trivial matter by some parties. However, from the researcher's point of view, this element can have a significant impact and can subsequently produce the formation of competitive human capital in fostering the nature of being responsible for the sustainability of the environment. The same reinforcement was also stated by Mustapha Kamal, Zahiah and Abdullah (2010) that the need for a human being to have the main elements of high quality where the three main elements are mind, spirit and body must be nourished and refreshed. This explains that the balance of all aspects should be emphasized to produce good human capital formation. In the context of this study, the emphasis on the value element of environmental sustainability is focused on RAC students at VC in Malaysia. In the context of environmental sustainability, there are previous studies that emphasize the need to educate students on environmental sustainability and that it needs to be applied and mastered by students. According to Lakshman (2014), there is an increase in the need for ethical education and taught values in the field of skills training and TVET in Fiji.

This excerpt shows that there is a reasonableness and need to develop a value-based curriculum model for environmental sustainability in VCSC_RAC as a result of the lack of specific focus on the value aspect of environmental sustainability in VCSC_RAC. A holistic approach to human capital development integrated with skill training education in Malaysia is

very necessary (Zulkifli and Mohd Nor, 2016). This is in line with the National Education Philosophy (NEP) which is used as the basis for the formation of a balanced, harmonious and comprehensive education. Ismail (2015) stated that the same is also in line with the view of Lukman Hakim (2014) where his study on Polytechnic students states that the formation of the student's personality can be formed through the Islamic education curriculum. This is further reinforced by (UNESCO, 2014), almost 3 out of 10 employers (28 per cent) stated that the factor contributing to the current skills mismatch is transversal skills, which is one of the components of these skills ethics and values. However, in general, the formation of human capital at the higher education level in Malaysia is through general education courses (Wan Mohd Tarmizi & Munirah, 2014; Zulkefli, 2002). As the public knows that the proposed general subject is towards the development of the student's personality and the appropriate subject is related to the application of values towards environmental sustainability.

Therefore, the excerpts that have been discussed make researchers want to build a curriculum model so that they can help VC_RAC and its teachers in planning the best strategy for applying values to environmental sustainability and students can also apply a sensitive attitude and have a high-value of sensitivity to environmental sustainability around in their daily lives. At the same time, the existence of this model can increase the effectiveness of teaching and learning to produce students who are skilled and skilled and then have good ethics, values and morals towards environmental sustainability.

3.1 Development of Element Prefixes and Values

At the initial stage, the process involved in this section is a reading and literature review to build an initial list of elements confirmed by experts for element verification before being brought to the NGT process. A total of 6 experts have been selected from each VC zone and some of them consist of curriculum drafters, department heads, program heads, and excellent teachers in the field of RAC to obtain accurate views and recommendations regarding the initial list of elements. The list of accepted and verified elements will be taken to the NGT process. Next, the nine NGT experts consist of RAC experts, environmental experts, industry experts and curriculum experts. At this stage as well, a list of elements that have been obtained because of reading the literature has been presented. At this stage, a list of elements has been selected and used as a guide in the formation of the model.

3.2 Respondents

According to (Lomax & McLeman, 1984; Dobbie et al., 2004) some scholars state that NGT can be carried out in a large cohort or group, but it can be broken into small groups so that effective communication can be carried out depending on the needs of the study. There is some debate about the most appropriate sample size for conducting studies using the NGT technique which has received attention from researchers. For that purpose, the following is the appropriate sample size and has been used by the researcher which has been detailed in table 2.

3.3 Element Appraisal Expert before being taken to the NGT process

Table 2 . Element Appraisal Expert Profile before being brought to the NGT

No.	Position	Field of Expertise	Experience
1.	VC Lecturer	RAC (Central Zone)	29 years
2.	VC Lecturer	RAC (North Zone)	28 years
3.	VC Lecturer Ex Curriculum Developer	RAC (South Zone)	28 years
4.	Lecturer VC Head of Mechanical and Production Department	RAC (East Zone)	27 years
5.	Lecturer VC Ex-Head of Workshops & Head of Programme	RAC (Sarawak Zone)	30 years
6.	Lecturer VC Ex-Head of Programme & Curriculum Developer	RAC (Sabah Zone)	27 years

3.4 NGT Expert

Table 3. NGT Expert Profile

NO	POSITION	FIELD OF EXPERTISE	EXPERIENCE
1.	Associate Professor	Environmental Education (University of Putra Malaysia)	20 years
2.	Senior lecturer	Environmental Education (Teacher Education Institute)	15 years
3.	Environmental Control Officer	Environmental Education (Department of Environment)	15 years
4.	Lecturer	Curriculum Panel VCSC_RAC (VC)	10 years
5.	Lecturer	Expert Teacher & Ex-Head of RAC (VC)	12 years
6.	Lecturer	Industry Fellow of RAC (Tun Hussein Onn University of Malaysia)	15 years
7.	Lecturer	Writer of Refrigeration & Air Conditioning Servicing Sectors (RACS) Module Environmental Department (Industrial Training Institute)	12 years
8.	Lecturer	Speaker for the Air Conditioning and Air Conditioning Sector Engineer Course Program (RACS) - Polytechnic	13 years
9.	Industry Executive	Industry RAC (Research Department)	14 years

Meanwhile, for participants who are field experts, the following are expert criteria that may also be used as suggested by Siti Farah and Saedah (2015) to determine the criteria for participants who involve in discussion in groups, namely:

- (i) individuals who have extensive knowledge and background or experience in fields related to the study.
- (ii) willingness and time suitability to take part in the study.
- (iii) Having good communication skills.
- (iv) Having experience of more than 5 years.

According to Thor (1987), states that individuals who tend to criticize and judge other people's ideas in meetings are not advised to join this discussion session. This is reinforced by several criteria must be met in selecting participants where the participants involved must be knowledgeable people in the field being studied and participants have various backgrounds and allow participants to share views on issues from different angles and provide views different ideas.

4. NGT Workshop Supplies

Considering that post-Covid 19 which hit the country and the world around 2020 and 2021 and MCO, enforcement is still being enforced by the government, the investigators believe that the Google Meet meeting method, the telegram application and whatsapp were used throughout the conversation and this method was appropriate at that time. The following states the reasons and justification for the method of the study carried out.

4.1 Places (Google Meet)

The choice of venue for the NGT session to be held is important so that quality ideas can be generated. Make sure the place chosen is comfortable and conducive. Tables are arranged accordingly to facilitate conversation. Participants are also provided with workshop equipment such as pencils, pens, paper, related notes, and other accessories deemed necessary. However, investigators cannot carry out the method face-to-face because after Covid-19 and the enforcement of MCO powers is still in force. Then the appropriate method is carried out in the form of a google form inquiry and the expert will choose an agreement based on the Likert scale given for each element.

4.2 NGT Introduction Session

The investigator as the moderator needs to determine the main things in the introductory session that should be explained in the google meet session, namely:

- (1) giving greetings to all participants;
- (2) stating the purpose or interests of the workshop;
- (3) introduce each participant involved in addition to their expertise;
- (4) the moderator explains the guidelines regarding the NGT process so that all participants understand;
- (5) explain how the results of the discussion decision will be used.

4.3 Custom NGT Process

Considering that post-Covid-19 and the strengthening of MCO powers are still in force, a group of selected experts have been brought together in the telegram application group and

investigators are constantly talking with a group of NGT experts through the telegram group. Then the questions in the form of a google form were circulated via telegram and the experts answered the questions. Then the investigator as the moderator talked with a group of experts through a google meet according to the date, day and time specified and the investigator obtained approval from the group of experts to facilitate the next process. The workshop is controlled by investigators who act as moderators to facilitate the communication process between a group of experts. The custom NGT process that has been carried out begins with the investigator initially listing a list of activity elements that are suitable for implementing values for the preservation of the surrounding environment in VCSC_RAC. This list of elements has also been given before being discussed so that experts can read the list of elements and continue to answer the probing questions provided via the google form. The existing list of elements will be discussed by the experts involved. This initial list of elements is necessary as a guide for starting a workshop session via the google meet method. This allows the discussion period to be shortened because experts already know about the list of elements through the Google form and pdf files that have been extended in the Telegram group. However, experts may respond whether they agree or disagree with the initial list of activity elements that are presented. Only elements that reach an agreement through mutual agreement are included in the model which will be developed through the Interpretive Structural Modeling (ISM) process later. Experts are also justified in expressing additional ideas that are deemed necessary for the model.

4.4 Advantages and Disadvantages of NGT

According to (Dang, 2015 and Odu, 2017;), a technique was introduced, and there are advantages and disadvantages in its application. The following are the advantages and disadvantages of the NGT method:

Table 4. Advantages and Disadvantages of NGT

	Advantages	Disadvantages
1.	The NGT method is more structured than the traditional approach. All participants are given equal opportunities in the conversation.	Topics that may be discussed through the NGT are limited to one issue at a time.
2.	NGT can be used in small groups or with many participants. As a rule, the quality of the ideas selected at the end of the session is very high. Many studies prove that the quality of NGT ideas is better than other decision-making techniques	NGT takes a long time to reach an agreement but in this study, the investigator has shortened the time because the elements have been awakened first and only accept or reject the elements presented.
3.	This clearly shows that the NGT remains transparent by not naming the participants involved. NGT assists any group that is unable to reach a unanimous decision on an issue. In addition, the NGT needs a place equipped with proper seating arrangements and other materials. However, considering that after Covid-19 and the strengthening of MCO regulations, the Google Meet method was very relevant at that time.	NGT requires a moderator who is experienced in overseeing the conversation session.

5. Initial List of Elements before being brought to NGT

Table 5. Preliminary List of Elements before being brought to NGT

No	List of MNAS Activities
1.	The teacher tells about how to identify environmental problems.
2.	The teacher questions and answered with students about awareness of environmental pollution.
3.	The teacher asks students to tell about the impact of refrigerant gas.
4.	The teacher asks students to explain the effects of global warming and the depletion of the ozone layer.
5.	The teacher questions and answers with students about aspects of protecting the environment.
6.	The teacher shows pictures to students related to environmental damage.
7.	Teachers share information with students about Acts and regulations about the environment via the internet.
8.	The teacher shows the students a documentary-related video about the natural surroundings.
9.	The teacher embodies the spirit of identity to students about being friendly with the environment.
10.	Teachers raise awareness among students about controlling the cylinder gain that is not correct and will cause an explosion.
11.	Teachers share information with students about the work of acquiring, recycling and redeeming refrigerants aimed at preventing the release of refrigerants into the atmosphere which can lead to global warming and depletion of the ozone layer.
12.	The teacher reminds students of the need for dry powder-type fire extinguishers to be available and to always use suitable Personal Protective Equipment (PPE) as a precaution when operating the system.
13.	Students build a scrapbook about the effects of refrigerant gas.
14.	Students write essays about respecting and caring for the natural environment.
15.	Students deliver lectures on the depletion of the ozone layer.
16.	Students produce posters regarding smoking, using guidance phones and working more than 2 meters from any ignition source.
17.	The teacher asks students to explain the types of cooling materials.
18.	The teacher shows awareness about ozone-depleting substances (ODS) and the potential for ozone destruction (ODP).
19.	The teacher asks the students to tell about the effect of purple radiation (UV) that stems from the depletion of the ozone layer.
20.	The teacher tells the students about the role of the Environment Department and the impact of the Green House.
21.	The teacher asks students to produce a scrapbook on the World Warming Potential (GWP), the Montreal Protocol and the Act on Quality of the Surrounding Nature, 1974 (Deed 127).
22.	The teacher questions and answers the students about the Import Control of Ozone Destroying Substances (ODS) under the 1967 Customs Deed.
23.	The teacher raises awareness for students not to release refrigerant into the air while working on the RAC system.
24.	The teacher applies to students during acquisition work, the limit that is acceptable for acidity is 0.2 Total Acid Number (TAN) and 100 ppm humidity to reuse coolant.

25. The teacher forms students to practice the work procedure regarding the production cylinder must be free from moisture and carrying out periodic leak tests.
26. The teacher reminds students not to release excess charge out into the air and it is necessary to use a recovery machine and re-charge after vacuum.
27. The teacher encourages students to work on controlling refrigerants in areas that have good ventilation.
28. The teacher tells the students about redemption work to reduce the release of refrigerants into the atmosphere.
29. Students carry out work on the removal of refrigerant (procurement) according to ISO 11650 & AHRI 740 standards.
30. The student takes care to make sure all the connecting rod hose connections are correct and tight while the acquisition work is done.
31. The student expressed concern about the valves on the cylinders and the unit having to be closed manually to avoid overfilling the cylinder gains.
32. Students are concerned about the work of separating oil, removing non-condensable gases and using devices such as drying filters to absorb moisture and acidity by using a recycling machine.
33. Students expressed concern about the refrigerant needing to be restored to original specifications and complying with the AHRI 700 Standard while performing redemption work.
34. Students are concerned that different types of refrigerants should not be mixed in a system while performing redemption work.
35. The student expresses concern about recovery cylinder inspection work and retesting to avoid damage.
36. Students raise awareness about avoiding contact with liquid refrigerants that can cause Frost Bite.

6. Final List of NGT Elements (Drawing Process)

Table 6. List of elements based on values for the environment

Activity Element	P1	P2	P3	P4	P5	P6	P7	P8	P9	Total	Pct. (%)	Status
1 The teacher interacts with students about environmental pollution awareness.	6	7	7	7	6	7	6	7	7	60	95.2	Accept
2 The teacher gives a scrapbook assignment regarding the impact of releasing refrigerant into the atmosphere.	6	7	6	4	6	7	6	6	7	55	87.3	Accept
3 The teacher asks students to share knowledge about the effects of global warming and the depletion of the ozone layer.	7	7	6	6	6	7	5	6	7	57	90.5	Accept
4 The teacher interacts with students about aspects of protecting the environment.	6	7	6	7	6	7	6	6	7	58	92.1	Accept
5 The teacher shares information with students about the 1974 Environmental Quality Act and the regulations under it through the website page.	7	7	7	7	6	7	5	6	7	59	93.7	Accept

6	Teachers raise awareness to students about controlling a gain cylinder that does not follow specifications will cause an explosion.	7	7	7	7	6	7	7	7	7	62	98.4	Accept
7	Teachers share information with students about the work of acquisition, recycling and redemption to aim at preventing the release of refrigerants into the atmosphere that causes global warming and depletion of the ozone layer.	7	7	7	7	6	7	6	7	7	61	96.8	Accept
9	The teacher asks students to explain the types of cooling materials used in the work of operating air conditioning and cooling systems.	7	7	7	7	6	7	6	6	7	60	95.2	Accept
10	The teacher shows awareness about ozone-depleting substances (ODS) and the potential for ozone destruction (ODP).	7	7	7	7	6	7	6	7	7	61	96.8	Accept
11	The teacher asks the students to tell about the effect of purple radiation (UV) that stems from the depletion of the ozone layer.	7	7	7	7	6	7	5	6	7	59	93.7	Accept
12	The teacher tells the students about the role of the Department of Environment and the Impression of a Green House.	7	7	7	7	6	7	6	7	7	61	96.8	Accept
13	The teacher asks students to produce scrapbooks on the World Warming Potential (GWP), the Montreal Protocol and the Quality of the Surroundings Act, 1974 (Deed 127).	6	7	7	6	6	7	5	6	7	57	90.5	Accept
14	The teacher questions and answers the students about the Import Control of Ozone Destroying Substances (ODS) under the 1967 Customs Deed.	6	7	7	6	6	7	5	5	7	56	88.9	Accept
15	The teacher applies during the acquisition process, the limit that can be accepted for acidity is 0.2 Total Acid Number (TAN) and 100 ppm humidity to reuse coolant for students.	7	7	7	7	6	7	6	5	7	59	93.7	Accept
16	The teacher reminds students to practice the procedure regarding the production cylinder must be free from moisture and carry out leak tests periodically.	7	7	7	7	6	7	6	6	7	60	95.2	Accept
17	The teacher reminds students not to release excess charge out into the air and need to use the recovery machine and then need to recharge after vacuum.	7	5	7	4	6	7	6	7	7	56	88.9	Accept
18	The teacher applies the work practice of controlling refrigerants in areas that have good ventilation to students.	7	7	7	7	6	7	7	6	7	7	96.8	Accept
19	Students carry out work on the removal of refrigerant (procurement) according to ISO 11650 and AHRI 740 standards.	7	7	7	7	6	7	5	6	7	7	93.7	Accept

20	Discipline students to make sure all interconnection connecting rods are correct and tight during acquisition work is done.	7	7	7	7	6	7	6	6	7	7	95.2	Accept
21	The student expressed concern about the valves on the cylinders and the unit having to be closed manually to avoid overfilling the cylinder gains.	6	7	6	5	6	7	5	6	7	6	87.3	Accept
22	Students are concerned about safety while carrying out the work of separating oil, removing non-condensable gas and using drying filters to absorb moisture and acidity by using a recycling machine.	6	7	7	7	6	7	6	6	7	6	93.7	Accept
23	Students are aware of the need for refrigerants to be restored to original specifications and comply with the AHRI 700 Standard while performing redemption work.	6	7	7	7	6	7	5	7	7	6	93.7	Accept
24	Students are aware that coolants of different types should not be mixed in a system while performing redemption work.	7	7	7	7	6	7	7	7	7	7	98.4	Accept
25	Students are aware of recovery cylinder inspection work and retest to avoid damage.	6	7	7	7	6	7	5	6	4	6	87.3	Accept
26	Learn about avoiding contact with liquid refrigerants that can cause Frost Bite.	7	7	7	7	6	7	6	6	5	7	92.1	Accept
27	Students produce essays entitled caring for and respecting the natural surroundings.	5	5	6	7	6	7	5	6	7	5	85.7	Accept
28	Students produce posters regarding the prohibition of smoking and using guidance phones and need to work more than 2 meters from any ignition points.	5	7	7	7	6	7	7	5	5	5	88.9	Accept

7. Application of NGT on Value Element Development

At this stage, the results in table 5 are used to be presented to a group of 9 experts in the NGT session to get views, explain ideas and paragraph structures and make decisions about whether to perpetuate or reject ideas that are irrelevant to the context of the study. At the end of the NGT session meeting, a consensus was reached by a group of experts in which the experts agreed to accept the 28 elements that had been reserved at the initial stage without rejecting the existing elements. These selected elements have been validated and the verse structure improved by a group of experts. The experts have also been given a set of questions for the validity and trustworthiness of the data in the creation of a value-based model for environmental sustainability in VCSC_RAC before the ISM process is carried out. This draw also aims to accept and reject elements that have been reserved as a result of the discussions that have been debated in this collection. Table 5 shows the results of the results obtained for developing value elements for environmental sustainability in the VCSC_RAC along with the scores, percentages and also the priority of the results from the lottery to obtain expert consensus regarding the elements that have been presented. The scale used for this raffle is a

scale of 1 to 7, namely, scale 1 = Strongly Disagree; 2 = Strongly Disagree, 3 = Disagree; 4 = Disagree; 5 = agree; 6 = Strongly Agree; 7 = Completely Agree.

8. Conclusion

This study has explained the history, development, supply, and process of a customized NGT approach, while also discussing the advantages and disadvantages of this technique in developing value elements for the preservation of the surrounding nature in VCSC_RAC. This list of value elements aims to serve as the contents of the model content that will be developed later. In reducing problems related to global warming and depletion of the ozone layer due to the impact of refrigerants, this model can be used as an alternative to an effort towards environmental preservation. Overall, it can be concluded that there are 28 elements of value to the preservation of the surrounding nature that have been successfully developed using a customized NGT technique. The customized NGT technique turns out to be effective as a decision-making tool to obtain collective or mutual agreement in solving an issue or problem. The application of a customized NGT technique has assisted investigators in identifying the best elements to serve as guidelines for teachers to apply values to environmental sustainability into students' minds. A customized NGT not only helps investigators in saving time, but it has also even helped investigators in getting precise and precise views because the experts involved are experts who are very wise and experienced in the field of study. The application of customized NGT techniques also adds a variety of methods in investigations in Malaysia, especially in the field of education. This is also appropriate and relevant to the Industrial Revolution (RI 4.0) which emphasizes a flexible and organic curriculum system.

References

- Abdul Salam, Y. (2010). *Idea-idea Pendidikan Berkesan Al-Ghazali & Konfusius*. Bangi : Universiti Kebangsaan Malaysia.
- Aizzat Mohd. Nasurdin, Intan Osman & Zainal Ariffin Ahmad. (2006). *Pengantar Pengurusan*. Kuala Lumpur: Utusan Publications & Distributors Sdn. Bhd. Diakses Sept 1, 2015 dari <https://www.google.com/search?tbo=p&tbn=bks&q=isbn:9676118826>.
- Dang, V. H. (2015). The Use of Nominal Group Technique: Case Study in Vietnam. *World Journal of Education*, Volume 5(4), 14-25.
- Dobbie, A., Rhodes, M., Tysinger, JW. & Freeman, J. (2004). *Using a Modified Nominal Group Technique as a curriculum evaluation tool*, *Family Medicine* 36 (6), 402-406.
- Dowling K. L., St. Louis R. D. (2000). *Asynchronous implementation of the nominal group technique: Is it effective?* *Decision Support Systems*. Vol. 29 (3), Pg. 229-248
Duggan, W. E.
- Habibah @ Artini Ramlie ,Zaharah Hussin & Saedah Siraj ,Norshahrul (2018), Aplikasi Teknik Ngt (Nominal Group Technique - Teknik Kumpulan Nominal) Dalam Penilaian Elemen Model Pembangunan Profesionalisme Perguruan Pendidikan Islam : *The Online Journal Of Islamic Education* April 2018, Vol. 6, Issue 1.
- Haliza Abdul Rahman. (2018). Usaha dan cabaran dalam mengaplikasikan Pendidikan Alam Sekitar dalam sistem persekolahan Di Malaysia. *Asian Journal of Environment, History and Heritage*, 1(2), 61–70.
- Harvey, N., & Holmes, C.A. (2012). Nominal group technique: An effective method for obtaining group consensus. *International Journal of Nursing Practice*, 18(2), 188-194.
- Ismail, S. (2015). Pembangunan Insan dalam Falsafah Pendidikan Kebangsaan. *Journal of Human Capital Development*, Vol. 8(No. 2), pp. 83-99.
- Lakshman, S. (2014). Education For Ethical Practices: Aligning Curriculum To Workplace Needs And Objectives. *International Journal of Technical Research and Applications*. Special Issue 10. P 132-135.
- Lukman Hakim, A. (2014). Persepsi pelajar terhadap kurikulum Pendidikan Islam Politeknik dalam pembentukan sahsiah Muslim. *Jurnal Pendidikan Malaysia*, 39(2), 133-140.
- Lomax, P. & McLeman, P. (1984). *The uses and abuses of nominal group technique in polytechnic course evaluation*, *Studies in Higher Education*, 9 (2), 183-190.
- McMurray, A.R. (1994). Three Decision-making Aids: Brainstorming, Nominal Group and Delphi Technique. *Journal for Nurses in Staff Development*, 10(2), 62-65.

- Mustapha Kamal, A. K., Zahiah, H. & Abdullah, Y. (2010). Pembangunan Modal Insan dan Tamadun Islam Dari Perspektif Pendidikan Guru. *Proceedings of The 4th International Conference on Teacher Education* ; Bandung Indonesia.
- Odu, O.G., (2017). Relationship between Nominal Group Techniques and Concurrent Engineering: A Review. *International Journal of Latest Research in Engineering and Technology*. Volume 3. PP. 47-62.
- O'Neil, M.J & Jackson, L. (1983). *Nominal Group Technique: A process for initiating curriculum development in higher education*, *Studies in Higher Education*, 8 (2), 129-138. doi10.1080/03075078312331378994
- Perry, J. & Linsley, S. (2006). *The use of the nominal group technique as an evaluative tool in the teaching and summative assessment of the inter-personel skills of student mental health nurses*, *Nurse Education Today*, 26 (4), 346-353. doi:10.1016/j.nedt.2005.11.004
- Siti Farhah A. A. & Saedah S. (2015). Pembangunan Model Objektif Kurikulum Berasaskan Taman Buah-Buahan Dan Sayur-Sayuran Berkhasiat Untuk Sekolah Rendah Orang Asli. *Jurnal Kurikulum dan Pengajaran Asia Pasifik*. Bil 3 Isu 3. 1-13.
- Thor, C. (1987). *Nominal group technique*. *Incentive Marketing*, 101, 28-29.
- UNESCO. (2014). *Transversal Skills in Technical and Vocational Education and Training (TVET): Focus on Pedagogies and Assessment in the Asia*.
- Van de Ven, A., & Delbecq, A.L. (1971). Nominal versus Interacting Group Processes for Committee Decision-Making Effectiveness. *Academy of Management Journal*, 14(2), 203-212.
- Wan Mohd Tarmizi, W. O. & Munirah, M. (2014). Pelaksanaan Kursus Pengajian Umum Berteraskan Pendidikan Islam Dalam Pembinaan Modal Insan: Pengalaman Politeknik *Prosiding Seminar Antarabangsa Kelestarian Insan*.(INSAN2014).
- Zulkifli M. N., (2002). *Pandangan para pelajar terhadap kursus TITAS di IPTA: Suatu kajian kes di Universiti Utara Malaysia, Sintok, Kedah Darul Aman*. Jabatan Sejarah dan Tamadun Islam, Bahagian Pengajian Usuluddin, Akademi Pengajian Islam, Universiti Malaya, Disertasi Ijazah Sarjana Usuluddin.
- Zulkifli, M. S., & Mohd Nor, M. (2016). Pendidikan, Latihan Teknikal Dan Vokasional (PLTV) Mampan: Satu Sorotan Falsafah Pendidikan Melahirkan Modal Insan Holistik. *SkillsMalaysia Journal*. Vol. 2, No. 1. 1-10.

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