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An Assessment of Training and Program Practices in Adoption of Hydrogen Fuel Cell Vehicles (HFCV) in Malaysia: A Study in Bangi Industrial Area, Bangi, Selangor

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ABSTRACT

This paper presents the results of a study on the assessment of training and development practices in adoption of hydrogen fuel cell vehicles (HFCV) in Malaysia with Bangi Industrial Area as focused of the study area. The results showed that overall total score the training and development strategy driven is 38%, overall score of training and development program is 33% and overall score of training and development evaluation practices is 35%. Therefore, the study gave a good signal that the adoption of HFCV will be accepted if the training and development practices can be improved for better operation management of HFCV in Malaysia.

Keywords: T&D Strategy Driven; T&D Development Program; T&D Evaluation

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AN ASSESSMENT OF TRAINING AND PROGRAM PRACTICES IN ADOPTION OF HYDROGEN FUEL CELL VEHICLES (HFCV) IN MALAYSIA: A STUDY IN BANGI INDUSTRIAL AREA, BANGI, SELANGOR

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Abstract

This paper presents the results of a study on the assessment of training and development practices in adoption of hydrogen fuel cell vehicles (HFCV) in Malaysia with Bangi Industrial Area as focused of the study area. The results showed that overall total score the training and development strategy driven is 38%, overall score of training and development program is 33% and overall score of training and development evaluation practices is 35%. Therefore, the study gave a good signal that the adoption of HFCV will be accepted if the training and development practices can be improved for better operation management of HFCV in Malaysia.

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1. Introduction

A **hydrogen vehicle** is a vehicle that uses hydrogen as its onboard fuel for motive power. Hydrogen vehicles include hydrogen fueled space rockets, as well as automobiles and other transportation vehicles. The power plants of such vehicles convert the chemical energy of hydrogen to mechanical energy either by burning hydrogen in an internal combustion engine, or by reacting hydrogen with oxygen in a fuel cell to run electric motors. Widespread use of hydrogen for fueling transportation is a key element of a proposed hydrogen economy (Romm and Tesla, 2014).

Malaysia is still in a stage of development of Hydrogen Fuel Cell Vehicles (HFCV) and many of the engineering stage process will take place on adoption of HFCV including the training and program that is very essential to be adopted for successful of HFCV adoption in Malaysia specifically. The training and development in adoption of HFCV in Malaysia specifically need to be explored with the main objectives as following:

1. Explores opportunities in “design” and skills of HFCV and identifies knowledge gaps towards establishing a range of collaborative projects with industry, professional associations, firm education and training institutions and government.
2. Identifies experts in HFCV in areas of design, and to conduct a range of education and training activities such as workshops, lecturers and exhibitions.
3. Participations at the “Hydrogen and Fuel Cell Futures” conferences and exhibition as to impart knowledge and technology transfer in HFCV.
4. The need to gain comprehensive understanding in the field of Renewable Energy specifically related to Hydrogen Fuel Cell Technology.

The areas of training and development practices for HFCV are very much concerned on the following:

- Hydrogen Production, Separation and Storage
- Fuel Cell technology
- Optimizing Fuel Cell Performance
- Installation, Maintenance and Repair
- Safety, Codes and Standards

▪ Fuel Cell Education Program

Training is one of the alternatives in producing competent, knowledgeable and skillful work force. Blanchard, P.N and Thacker J.W (2014) stated that training is a systematic process in providing opportunity to learn skill, knowledge and certain ability to complete current or future work. In heading towards successfully implementing training and development, in adoption of HFCV in Malaysia, the following criteria of T&D should be enforced for the success of HFCV adoption practices.

2. Literature Review

1. HFCV Training and Development Strategy Driven:

- Long-term Development
- Investment and Incentive

HFCV Training and Development Strategy Driven and Long-Term Development: According to Carneiro and Heckman (2003), human capital investment in an organization is very important from an individual's perspective because most individual human capital is accumulated the whole life, whether at work or outside. With this importance, it will create bigger incentive for organization to invest in their organization or particular work training sector. Employee's training and development doesn't mean only to obtain new knowledge, skill and ability, but also introduce employee to change, encouraging employee's attitude change, introducing employee to important business decision and involving them actively in making decision.

HFCV Training and Development Strategy Driven and Investment and Incentives: Training requires time, energy and money. It is a critical investment in a strategy that leads to internal promotion,

substitution plan and employee's development.

HFCV Training and Development Program:

- Comprehensive Program
- Career Development
- Improve Performance

Organizations need to design an effective training program that employees benefit from the training provided by increasing confidence in the ability of their employees in performing their duties.

Career development is a process and activity to prepare employee for position in organization, which will be conducted in the future. Career development for an individual has to be done because an employee does not only want what he has but also expecting changes, advancement and opportunity to advance further.

2. HFCV Training and Development Evaluation:

- Employees Evaluation

Evaluation of training and development means assessment of the impact of training on trainee's performance and behavior. The effectiveness of each step must be continually assessed. Generally a good training and development programs start with identification of training and development needs and will be end with evaluation of training. Training and development evaluation is an important aspect in training program. In general, all good training and development program starts with identifying training and development needs and ended with training evaluation.

3. Research Methodology

a. Research Objective

This objective of the study is to assess the Training and Development practices in adoption of the HFCV in Malaysia with focused study in Bangi Industrial Area in Bangi, Selangor.

b. Research Instrument

Training and Development practices consists of 31 items of questions and measured using a 5-point Likert-scale ranging from (1) Strongly Disagree, (2) Disagree, (3) Moderately Agree, (4) Agree and (5) Strongly Agree. The researcher adapts the questionnaire and adjusted according to the requirements and need of HFCV training and development practices. There are three dimensions to measure the HFCV training and development practices as follows:

A. HFCV Training and Developments Strategy Driven

- The organization emphasizes on HFCV long-term development for employee training plans.
- The organization offers HFCV behavioral training which helps to teach employees about corporate culture and its values
- **Investment and Incentives**
The organization incentive for employee's development has encouraged employees to commit themselves to perform better.
(Kaplan, R.S (2001)

B. HFCV Training and Development Program

Comprehensive Program

1. The organization develops and traces, HFCV employee training plans.
2. The organization HFCV training activities for the employees are comprehensive.
3. The training HFCV activities for the employees are continuous.
4. Availability of HFCV comprehensive training policies and programs.

(Source: Usha Tiwari, 2014)

HFCV Career Development

1. The training offered by the organization provides career development opportunity.
2. Employees are strongly encouraged to develop their skills in green management

HFCV Improve Performance

1. The HFCV training helps improve employees' performance.
2. The employees are properly trained when there is a new piece of HFCV quipment.

C. HFCV Training and Development Evaluation

1. The organization frequently evaluates employee training programs.

c. Pilot Study

Reliability refers to the consistency and stability of the set of items that are used to measure review. The pilot study has been conducted and the researcher used

Cronbach's Alpha Value to ensure validity of the items statement. A pilot study was conducted among 15 students at post-graduates level and 10 lecturers from Universiti Tenaga Nasional (UNITEN). The result of Pilot Study is presented in Table 1 below:

Table 1: The Alpha Cronbach Value of Pilot Study

Independent Variables	Items	Alpha Cronbach Value
HFCV Training & Development Practices		
• HFCV T&D Strategy Driven	31 items	0.947
• HFCV T&D Program		
• HFCV T&D Evaluation		

4. The Research Findings

The findings were presented as follows:

a. Section A – Demographic Profile

The number of respondents that involved in the study was 150 respondents in Bangi Industrial Area. The respondents of the study consists of employees in automobiles-related industry like mechanics, technicians, engineers and operational staff in engineering. The respondents' demographic profile of respondents was summarized in majority of respondents as per shown in Table 1.

Table 1: Summary of Demographic Profile of Respondent

No	Demographic Variable	Majority	Percentage (%)
1	Gender	Male	54.2
2	Citizen	Citizen	100.0
3	Age	21-30 Years	51.5
4	Race	Malay	86.5
5	Religion	Muslim	88.9
6	Education Level	Diploma	31.5
7	Job Category	Administration	31.8
8	Monthly Income	RM 1,001 – RM 5,000	81.2

The results as shown in Table 1 shows the majority of respondents who participated in this study found that there are 54.2 percent more male respondents in this survey than female respondent, and all the respondent is a citizen of Malaysia (100 percent). The survey respondents are composed primarily of age

between 21-30 years, accounting for 51.5 percent of the respondents. In term of race, 86.5 percent of respondent are Malay and 88.9 percent are Muslim respondent. 31.5 percent majority respondents have their diploma in education level and 31.8 is made up of clerical job for respondent job category. More than 81.2 percent of the of the sample population have a monthly income from RM 1,001- RM 5,000 in Bangi Industrial Area, Bangi, Selangor.

b. Section B: Training and Development Initiatives

Question 1:

What is the HFCV essential knowledge areas needed for training (non-engineering)?
The response from respondents are listed and rank accordingly as per listed in Table 2.

Table 2: The HFCV Essential Knowledge Areas Needed for Training

Knowledge Areas	Mean	Rank
Schedule management and planning	4.28	1
Cost management	4.17	2
Quality management	4.15	3
Risk management	4.05	4
Human Resource Management	4.00	5
Supply chain management	3.96	6
Claims management	3.89	7
Knowledge management	3.75	8
Health and safety management	3.65	9
Ethical management	3.60	10
Conflict and dispute management	3.45	11
Information technology management	3.33	12
Communication management	3.12	13
Material resources management	3.00	14
Financial management	2.98	15
Plant and equipment resources management	2.86	16

Question 2:

What is the HFCV management skills areas needed for training (non-engineering)?
The response from respondents are listed and rank accordingly as per listed in Table 3.

Table 3: The HFCV Management Skills Areas Needed for Training

Management Skills Areas	Mean	Rank
Decision making	4.45	1
Delegation	4.27	2
Analytical	4.15	3
Team working	4.00	4
Problem solving	3.89	5
Leadership	3.74	6
Negotiation	3.65	7
Human behavior	3.55	8
Presentation	3.41	9

Question 3:

What is the HFCV Development Initiatives needed for employees?

The response from respondents are listed and rank accordingly as per listed in Table 4.

Table 4: The HFCV Development Initiatives needed by employees

Development Initiatives	Mean	Rank
Salary and Benefits	4.65	1
Promotion and Recognition	4.55	2
Compensation	4.25	3
Learning Program	4.06	4
Motivation	3.75	5
Training and Supervision	3.54	6
Employee Record for Evaluation	3.40	7
Research and Development	3.33	8
Mobility of work	3.25	9

Based on the research findings in Section B, its showed that the essential knowledge areas, management skill areas and development initiatives are required for HFCV adoption.

Section C: Training and Development Initiatives Practices

Based on the research findings in Section C that consists of HFCV T&D Strategy Driven, HFCV T&D Program and HFCV T&D Evaluation, results of the finding were presented as follows:

No	Statement Item	% of Agreement
PART A		
HFCV T&D STRATEGY DRIVEN		
ITEMS STATEMENT		
1	The HFCV organization emphasizes on long-term development for employee training plans.	Agree (32%)
2	The HFCV organization frequently evaluates the employee training programs.	Agree (29%)
3	The HFCV organization develops and traces employees training plan.	Agree (40 %)
4	The HFCV organization maintains adequate budget for employee training.	Agree (34%)
5	The HFCV organization training activities for the employees are comprehensive.	Agree (37%)
6	The HFCV training activities for the employees require extensive investments of time/money	Agree (35%)
7	The HFCV training activities for the employees are continuous.	Agree (38%)
8	The organization incentive for employee's development has encouraged employees to commit themselves to perform better.	Agree (41%)
9	The HFCV training offered by the organization provides career development opportunity.	Agree (40%)
10	The HFCV organization offers behavioral training which helps to teach employees about corporate culture and its values.	Agree (38%)
11	The HFCV training helps improve employees' performance	Agree (41%)
12	The employees are properly trained when there is a new piece of HFCV equipment.	Agree (39%)
13	Employees are strongly encouraged to develop their skills in management.	Agree (50%)
14	Availability of comprehensive HFCV training policies and programs.	Agree (37%)
AVERAGE TOTAL SCORE		AGREE (38%)
The average total score of all the 14 items in HFCV T&D Strategy Driven was 38% agreed to the item statement.		
SECTION B: HFCV TRAINING & DEVELOPMENT PROGRAM ITEMS STATEMENT		
% of Agreement		
1	HFCV T&D policy applicable to all employees	Agree (25%)
2	HFCV supervisors train employees on the right way of doing the job well	Agree (34%)
3	HFCV supervisors encourage the employees to share what they have learned with other employees	Agree (42%)
4	HFCV links T&D program with the company business strategy	Agree (30%)
5	The HFCV supervisors support the use of techniques learned in training that employees bring back to their jobs.	Agree (37%)
6	The HFCV supervisors give employees the chance to tryout their training on the job immediately.	

		Agree (37%)
7	The HFCV training aids (resources or technology) are available on the job support what employees learned in training.	Agree (38%)
8	The HFCV team members are efficient and effective to deal with HFCV operations and construction	Agree (30%)
9	The HFCV equipment use in training is similar to the equipment found on the job	Agree (28%)
AVERAGE TOTAL SCORE		AGREE (33%)
The average total score of all the 9 items in HFCV T&D Program was 38% agreed to the items statement.		
SECTION C: HFCV TRAINING & DEVELOPMENT EVALUATION		
ITEMS STATEMENT		
% of Agreement		
1	The HFCV T&D methods is suitable for employees as per required	Agree (29%)
2	The HFCV T&D instructors are well experienced and full of knowledge on HFCV	Agree (29%)
3	The HFCV course of contents fit and suits well with the HFCV requirements	Agree (32%)
4	The HFCV organization and preparation are well documented	Agree (38%)
5	The HFCV trainer is well prepared, highly skilled and motivated on the training	Agree (30%)
6	The HFCV T&D is helping the employees to enhance their career in industry as per required.	Agree (38%)
7	The HFCV T&D assessment is fair and justice to participants for development	Agree (37%)
AVERAGE TOTAL SCORE		AGREE (35%)
The average total score of all the 7 items in HFCV T&D Evaluation was 35% agreed to the items statement.		

5. Recommendations and Conclusions

The result shows that the respondents involved agreed with the constructive element of every dimension as per in the questionnaire. Based on the results of the entire study found that employee perception level in the Team-Based Practices are at the level agreed of overall the four dimension of team based practices are 32 percent.

For employee training and development of HFCV to be successful, the management should:

1. Provide a well-crafted job descriptions on HFCV foundation upon which employee training and development activities are built
2. Provide training required by employees to meet the basic HFCV competencies

for the job and it is a supervisor's responsibility.

3. Develop a good understanding of the HFCV knowledge, skills and abilities that the organization will need in the future.
4. Look for learning opportunities in HFCV every-day-activity.
5. Explain the employee development process and encourage staff to develop individual development plan specifically in their involvement in HFCV
6. Support staff when they identify learning HFCV activities that make them an asset to the organization

For HFCV employee development to be success, the individual should:

1. HFCV Self-Assessment review performance assessment to look over the skills, abilities and knowledge.
2. Identify the development activities in HFCV on methods and resources to be practices.
3. Committees made up of staff from different areas of the organization that will enhance learning by allowing members to see issues of HFCV from different perspectives.
4. Conferences and forums in HFCV where employees can attend conferences that focus on topics on relevance to their position and the organization
5. Critical incident notes on day-to-day activities are always source of learning in HFCV
6. Field trips to organizations serving similar HFCV can provide a valuable learning experience
7. Job aid are very useful for new employees on new responsibilities in HFCV specifically

8. Job expanding on HFCV when the employees already mastered the requirements of his or her job.

On the job experience for cost effective in HFCV:

1. Job rotation keeps his or her existing job but fill in for or exchange responsibilities with another employees to avoid boredom at work.
2. Coaching and mentoring needed continuously as to guide and advice professionally on HFCV practices
3. Networking to be built to meet professional development to discuss issues and environmental impact on HFCV
4. Endorse employees attending classes and activities that support the development plans and goals to be achieved in HFCV.
5. Offer opportunities for promotion and/or lateral moves contributes to the employee's career satisfaction in HFCV

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