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SCIENCE CENTRE ENGAGEMENT ON VISITOR PERSONAL CONNECTION

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Abstract: Museum exhibition environment provides experiential learning through its messages to influence knowledge, attitudes and learning behaviours of visitors. Connections in visitors’ cognitive, affective, emotional and physiological responses play a beneficial role in museum visits. The research focuses on how science centre as part of a museum discusses various methodological approaches to encourage visitor into having a response. The review highlights multiple learning theories underpinning how visitors learn and how these theories impact a museum’s exhibition design efforts. Using the experience of selected Science Centres as primary case-studies, this paper examines different perspectives and methodological approaches. Nurturing visitor interest through visitor personal connection represents an essential recurring concept which strikes at the core of the exhibition design process. Visitors act as celebrants of science information in an edutainment context, motivated by a quest for social and enlightening experiences.

Keywords: Exhibition design; Informal learning; Science Centre; Visitor experience.

INTRODUCTION

The biggest challenge for science centre institutions is to strategically provide opportunities for cognitive and affective learning while simultaneously facilitating enjoyment and fun. Studies conducted found that many families choose to visit museums because they anticipate that there will be fun and entertaining things for everyone in their group to see and do there (Moussouri, 2003). In most instances, families say that they come to the centre to learn something new, to enjoy themselves and to spend quality time together (Borun, 2008). Recent studies in museum have examined various factors that can influence learning such as engaging visitors' emotions or connecting with visitors' prior knowledge and interests. The style of the exhibit presentation profoundly affects the kinds of thinking engaged in by visitors (McManus, 1989). In science centre, the varieties of exhibits spanning various disciplines are incubators of scientific knowledge and emphasise hands-on exploratory learning. Using the recent experience of selected renowned Science Centres as case-studies, this paper examines the responses of the centre management in order to explore the extent to which the process occurs.
OBJECTIVE

The objective is understanding science centre engagement in visitor personal connection through comparison of approaches across science centre institutions which differ in size, type and location. The support on quality visitor experience and informal learning intentions are the essence of this paper.

LITERATURE REVIEW

Exhibition design as a way of intentionally organizing and orchestrating the museum visitor experience began to receive greater prominence in the 1980s (Miles, Alt, Gosling, Lewis, & Tout, 1988). In the museum context, exhibitions have been likened to a play: an exhibition has an overarching theme or storyline (plot) that can be divided into acts (galleries or subdivided spaces) and scenes (display clusters). Individual elements such as text panels, images and objects can, in turn, be related to dialogues, soliloquies, and props (Crawley, 2012; Rabinowitz, 2013). Similarly, Yellis (2010) draws parallels between the museum and the theatre in the sense that both can transform visitors on an emotional level. He argues that both a strong narrative as well as attention to the exhibition staging, or atmospherics, are essential for enacting this transformation. While there has been much interest in experiences in the museum, tourism, and broader consumption literature, the term itself has been used interchangeably to describe some different concepts (Packer et al., 2013). In a museum, an experience can be seen as a process of mutual interaction or “dialogue” between a visitor and their setting (McCarthy & Ciolfi, 2008). The conception of visitor experience used in this study aligns with the definition as “an individual’s immediate subjective and personal response to an activity, setting or event outside their usual environment” (Packer et al., 2013).

The museum field is rich with literature that addresses the concept of informal learning or “free-choice” learning in museums (Falk & Dierking, 1992, 2000). Hein (1998) suggested that museums typically do not have set formal curriculum, rather they provide visitors with informal education opportunities. Visitors largely come by their own choice and are thus intrinsically motivated. They engage in activities in a self-directed manner, and therefore, their methods of learning are varied (Greenhill, 1999a). In describing the integration of intrinsic motivation into a theory of learning, Rice (2001) highlighted the task of museum educators is to move people into becoming learners. “…In the mission of moving people from a recreational agenda to a learning-centered agenda, there is no better motivator than a powerful aesthetic experience” Rice (2001, pp. 49). A theory of learning that integrates into it the function of motivation is ultimately one that can reconcile affective experiences with the construction of meaning. According to Perry (1992), requirements for an intrinsically motivating museum experience include the ability to instill curiosity, challenge, control, confidence, play and communication in the visitor’s experience. To achieve intrinsic motivation, the learning theories underpinning how visitors learn and how these theories impact a museum’s exhibition design efforts are further discussed.
METHODOLOGY

The research question that guided the investigation:

i. What are the methods used to encourage visitor into having a response?

ii. How do this effect visitor participation and immersion?

The method of inquiry used was educational connoisseurship and criticism (hereafter referred to as educational criticism), an arts-based qualitative method of inquiry initiated by Elliot Eisner (1998; 2002) and used now by researchers worldwide (see for example Flinders, 1996; Barone, 2000; Uhrmacher & Mathews, 2005). Educational criticism requires that the researchers describe, interpret, evaluate, and discern themes, although the distinctions are “sharper on paper than in fact,” Eisner points out (2002, p. 225). The descriptive aspect of educational criticism is intended to allow the reader to “participate vicariously” in the educational situation, which points to the use of literary vignettes that are presented here. The author observed and recorded in photographs the scenography, exhibitions, and activities in the galleries. The data collection process come to a concluding interview during which time the author asked the respective Directors and Curator to reflect upon how creating interest and curiosity themes emerged at the core of the exhibition design process. Next, following Eisner’s ideas about “selecting a focus” and “building a plot” (see Eisner, 1998, pp.189-192), the researcher analyzed the data with pragmatic intent. That is, examined the data with an eye towards building a story. The researcher provides several vignettes that illustrate portions of design ideas from the case studies; these vignettes in part serve as the response to the first research question inquiring on the methods used to encourage visitor into having a response. This will lead the researcher to interpret how this effect visitor participation and immersion in an understanding level of engagement of the experiential settings. The researcher then draws out the dominant themes from the vignettes and discusses each in detail and relation to other relevant literature.

FINDINGS

i. Taking Science Home - Science centre hopes to address interest in science. The planning and design of exhibitions are aimed toward this goal.

ii. Making Science Accessible - A crucial requirement for helping visitors discover connections with science is to ensure the science centre and its contents are accessible to people.

iii. Providing Relevance by Drawing on Social Environment - Everyone has a preference - grounded in one’s cultural value and own personal experiences. Incorporating exhibits, information, and issues within the science centre exhibitions that reflect on visitor’s lives or social environment can help cultivate connections.

iv. Creating Interest by Engaging with the Exhibits - Sometimes unearthing discovery can pave the way to engaging with science, creating new interest, and introducing new ideas and connections.
CONCLUSION

Designing and developing exhibitions is a complex and organic process with many factors to consider - content, message, exhibits, layout, flow, media, lighting, timeline, and many other issues. The theme, engagement on visitor personal connection, explores the pertinence of the interrelationships formed while creating exhibitions. A science centre exhibition can be a difficult format through which to connect with visitors unless the content is presented in an accessible manner which draws on previous visitor experiences or offers new engaging opportunities. The exhibition design must support the message and aid visitors in cultivating connections by taking science home, making science accessible, providing relevance by drawing on personal and the social environment and creating new interest by engaging with an aesthetic theme.

The various design techniques discussed correspond quite closely with findings in Hood's (1983) study on museum visitor expectations. Hood identified social interaction, active participation and feeling comfortable in one's surroundings as the most valued attributes for occasional museum participants and non-participants. There is a definite overlap between the attributes Hood reported and the techniques identified in this study. In both cases, opportunities for visitors to interact, or connect, with the exhibitions and other people prove to be important. The exhibitions are a vital component in helping visitors make connections with science.

SELECTIVE REFERENCES


ENGINEER SPECIFIC JOB DEMAND SCALE DEVELOPMENT

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³ Faculty of Social Sciences & Humanities, Universiti Kebangsaan Malaysia.
⁴ Academy of Malay Studies, Universiti Malaya.

Abstract: This research study was carried out with the aims to formulate new measuring, which focuses on the measuring of job demands in the context of engineer’s job. The content of ESJD scale was validated via expert assessment using the Delphi Method (30 experts). Descriptive statistics, analysis factor with promax rotation, correlation analysis, linear regression analysis and one-way MANOVA test were used in this study to analyse the samples of registered engineers in Malaysia (N=504). The study showed satisfactory reliability and validity results for the new scale. The results of this study are expected to provide information to the management, administrators and organisational leaders in managing risks that affect the level of stress, psychological wellbeing and their impact on the level of professional commitment among engineers as well as the best method of implementing them.

Keywords: Job demand, Occupational stress, Psychological wellbeing, Engineers

INTRODUCTION

Parallel to meeting the needs of national and community development, engineering-related organisations and companies are required to work hand-in-hand in completing the aspirations of the people and nation. However, in the era of globalisation, engineering-related companies have to operate in a highly competitive open market with low profitability expectations, and even have to complete engineering projects on tight deadlines and faced with the constraints of very limited financial budget. Because of this, engineers as the main drivers of engineering-related companies are forced to face high job demands from management and clients, to continue to compete and further survive in business.
This has led to the occupational stress experienced by most engineers, following high job demands. Due to workload, many studies have reported cases of occupational stress experienced by engineers in various economic sectors (Bowen, Edwards, Lingard, & Cattell, 2014; Chen et al., 2011; De Silva, Samanmali, & De Silva, 2017). High workload and lack of salary and promotion prospects are among the two major contributory factors of occupational stress experienced by engineers (Yip & Rowlinson, 2009).

**OBJECTIVES**

We specifically address three goals: first, we identify, list down, develop and propose the occupational needs of specialised item engineers and ESJD measurement models based on comprehensive literary scans and expert opinions through Delphi techniques.

Second, we collect engineer researcher feedback data from various industries and gender background (N = 550). Random multistage sampling is used as a technique for determining samples. Third, we analyse the data. We conduct descriptive analysis to examine the data distribution. We perform reliability checks to determine internal consistency of the measurements. We assess, discriminate and reduce measuring items, based on the suitability of items to measure using principal component analysis techniques.

Next, we test whether the ESJD measurement model is suitable for research data, using a valid factorial analysis method. We hypothesise that the ESJD measurement model has a satisfying level of goodness-of-fit with the research data. Lastly, we examine the relation of ESJD towards the stress with regard to job, and psychological wellbeing among engineers.

**LITERATURE REVIEW**

Occupational stress experienced by engineers has become the subject of accumulated research (Hall et al., 2015; Ronen & Malach Pines, 2008). Concerns about the health effects of various stress relating to work, shortage of engineers and retrenchment among engineers have been highlighted in the national and global themes (e.g. Etzion, 1988; Keenan & Newton, 1985; Lingard, 2003; Rothmann & Malan, 2006).

One of the most frequently used theories is the job demands-resources theory, first introduced by Demerouti (2001) which is known as the JD-R model, and later improved and matured into the JD-R theory (Bakker & Demerouti, 2007, 2017). As detailed in the latest meta-analysis collection, the JD-R model has been used as part of the thousands of associations, and is used as part of the accurate size of research measurement (Alarcon, 2011; Bakker, Demerouti, & Sanz-Vergel, 2014; Crawford, LePine, & Rich, 2010; Nahrgang, Morgeson, & Hofmann, 2011).

According to Demerouti (2001), 'job demands' as demonstrated by the JD-R model and the determination of this investigation consideration refers to "the job aspects that require continuous physical or mental effort and are associated with certain physiological and psychological effects", for example; emotionally, has to work with customers or clients under high work pressure.
Job demands' in the JD-R model is a unique predictor for health problems such as stress due to work and fatigue. However, psychological measurements for job demands in the JD-R model are highly generic, since there are additional job demands that are specific for certain job contexts. The use of generic job demands can affect prognostic quality (Bakker & Demerouti, 2017). Hence, it is said that the causes of occupational stress, in this case, job demands, need to be identified in the design of specific occupational characteristics based on specific context by the types of employment, as a way to develop a better understanding of the relationship between job demands and stress (Sparks & Cooper, 1999).

For example, jobs in the healthcare sector such as nurses are recorded as having certain job demands such as emotional demand related to 'illness and death', 'patient needs' and 'patient threats and violence' (Sundin, Hochwälder, & Bildt, 2008). Specific job demands in the context of entrepreneurial jobs have been found, such as emotional demands related to 'uncertainty and risk' (Dijkhuizen, Van Veldhoven, Schalk, & Schalk, 2014).

Engineers also have a particular job design for certain responsibilities, for example; applying engineering theory principles to engineering projects; performing detailed engineering calculations to build manufacturing, construction and installation standards; investigating client or public complaints; determining the nature and extent of the problem; recommending recovery measures, etc. (International Labor Office, 2012).

Therefore, this study identified and developed a measurement scale of specific job demands for engineers, and subsequently compared the effects of job demands of ordinary occupations and engineer specific job demands, on the stress and psychological wellbeing associated with the work of an engineer.

METHODOLOGY

Literary analysis and interviews were performed to identify the engineer's job demand scope and subsequently to develop draft questionnaires. This was aimed to produce more specific measurements for job demands. Then, content validation process for the proposed measurement items was done through Delphi's repeated consultation process with the experts. Next, items were tested on face validity according to the criteria of the face validity analysis. For the purpose of the ESJD construct validity analysis (factorial analysis) and the subsequent analysis (linear regression analysis), the study collected feedback from respondents involving 504 engineers registered with the Board of Engineers Malaysia in various industry sectors of various engineering disciplines. Respondent's distribution by engineering disciplines is shown in Table 1.

<table>
<thead>
<tr>
<th>Engineering Discipline</th>
<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering</td>
<td>182</td>
<td>36.1</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>78</td>
<td>15.5</td>
</tr>
<tr>
<td>Electronic Engineering</td>
<td>64</td>
<td>12.7</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>94</td>
<td>18.7</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>43</td>
<td>8.5</td>
</tr>
<tr>
<td>Others</td>
<td>43</td>
<td>8.5</td>
</tr>
<tr>
<td>Total</td>
<td>504</td>
<td>100</td>
</tr>
</tbody>
</table>
Next, the items extracted in factorial analysis were tested for similarities in measuring certain job demands, regardless of the differences in demographics (i.e. type of industry, years of service, gender and engineering discipline). Afterward, the validity of the developed criterion scale was assessed. Based on the research hypothesis, these specific job demands of engineering have positive influence towards work-related stress and negative towards psychological wellbeing, and we estimated that the strength of the relationship far outweighed the relationship between ordinary job demands and psychological wellbeing and work-related stress. Reliability test was then performed.

**FINDINGS**

<table>
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<th><strong>Table 2. Results summary of the whole analyses</strong></th>
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<td><strong>RESULTS OF THE ESJD SCALE DEVELOPMENT ANALYSIS</strong></td>
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<tr>
<td><strong>ACTIVITY</strong></td>
</tr>
<tr>
<td>Development of scale draft</td>
</tr>
<tr>
<td>Delphi content validity analysis</td>
</tr>
<tr>
<td>Face validity analysis</td>
</tr>
<tr>
<td>Factorial analysis</td>
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<tr>
<td>Equality analysis</td>
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</tbody>
</table>
| Criterion validity analysis | - Challenge specific job demands recorded more positive relationship strengths towards occupational stress than ordinary job demands.  
- Challenge specific job demands recorded the strength of a positive relationship towards the psychological wellbeing parallel to job resources. |
| Reliability analysis | All six dimensions showed satisfactory internal consistency, Cronbach's alpha ranging from .92 to .94. |

**CONCLUSION**

The findings of the ESJD scale development analysis suggested that the ESJD scale is a measurement instrument that has a satisfactory level of validity and reliability to measure specific job demands for the context of an engineer’s job.
SELECTIVE REFERENCES


ENGINEER’S WORK ENGAGEMENT: DEVELOPMENT OF CONCEPTUAL FRAMEWORK THROUGH RELIGIOUS DIMENSION

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⁴ Academy of Malay Studies, Universiti Malaya.

Abstract: Employee engagement is a relatively new concept in the academic research community even though the concept of employee engagement has been popularly introduced to the public by human resources consultant firms. Academics and practitioners in the field of human resource management tend to agree that the basic concept of employee engagement can help to explain the behaviour of workers in the workplace, but the current definitions and concepts used are vary. Although the concept of employee engagement is an interesting element, the concept itself remains unclear in term of its definition. In fact, the concept of employee engagement as defined by western academician must first be adapted to local Malaysian culture and religion practice. This literature review examines and analyses the critical empirical gaps and conceptual differences in the definition of the concept of employee engagement in order to develop a basic concept of employee engagement that are appropriate for multi-cultural community of engineers in Malaysia.

Keywords: Employee engagement; Human resource management; Productivity; Work environment; Religious; Spirituality
INTRODUCTION

Engineer is considered an important asset in an engineering organization. The lack of talented and highly skilled workforce phenomenon occurs due to various factors such as global economic pressure which forces organizations to implement employee restructuring and results in a talent gap between Generation Y and the "baby boomers" generation (Gordon, 2009). To ensure that an organization does not experience shortage of high-skilled engineers, new methods need to be developed to maintain existing highly skilled workers and at the same time attract new employees with high potentials. One of the methods identified is to strengthen the employee engagement. However, up to this day, researchers still have differing views and have not yet reached the consent point in explaining the concept of employee engagement (Soldati, 2007; Wefald & Downey, 2009) noted that employee engagement is a relatively new concept in the academic research community. Furthermore, the concept of employee engagement defined by the western researchers has to be adapted to Malaysia's local culture and knowledge, in an effort to provide better prognostication of engineer’s psychological well-being.

OBJECTIVES

This study will examine how the concept of engagement is defined in the academic field and identify duplicate concepts that arise. Furthermore, this study will conclude and summarize on employee engagement concerning social sciences theory applied by academic researchers. The second objective of the study is to discuss religious elements in human resource management. Finally, the study develops a theoretical model of employee engagement in line with the context of engineers in Malaysia.

LITERATURE REVIEW

Concepts of Employee Engagement

Concept of employee engagement is interpreted as a level of mind concerning a positive and satisfying work that can be identified by characteristics of enthusiasm, dedication and absorption or ‘preoccupation’. All these three dimensions are considered to be able to form the most accurate, authentic and comprehensive engagement concept so far (Karatepe & Olugbade, 2009; Kim, Shin, & Swanger, 2009; Schaufeli & Bakker, 2004, 2010; Taris, Schaufeli, & Shimazu, 2010).

Theoretical Framework of Employee Engagement

Job-Demand Resources Model presented by (Bakker & Demerouti 2017) is the most integrative and comprehensive one. JD-R model also suggests that in the end, employee engagement will produce positive results for the organization such as good job performance.

The JD-R model also assumes that when this motivational resource is low, this situation can lead to burnout or fatigue and depression. Therefore, there is a need for the organisation to ensure that resources related to the workforce are provided for employees to avoid burnout. According to the JD-R model, heavy duty tasks and demands will also lead to burnout conditions. ‘Job resources’ will drive employees,
encourage their persistence, and will make them focus on work. The said motivation is the resource that can enhance the effort (energy), dedication (efficacy), and absorption (Schaufeli 2013).

The role of religious element in human resource management in Malaysia

Malaysia’s human resource management practices need to be understood in the context of a multiracial-racial Malaysian society where there is a mix of Islamic, Confucian and Western values (Mansor & Ali, 1998). Although Malaysians are multiracial, ritualistic and symbolic, they have similar values such as respect for parents, collective orientation, harmony, concern for dignity and religious orientation (Selvarajah & Meyer, 2008).

Culture in Malaysia is generally characterised by traditional values such as collectivism, with emphasis on harmony, respect for hierarchy, reciprocity, loyalty and importance of honour (Abdullah, 2001; Kaur & Metcalf, 1999; Sloane-White, 2008). The mix of cultural heritage and Islamic teachings needs to be understood, especially by multinational companies operating in Malaysia, as this clearly affects the human resource management system practiced.

PROPOSED MODEL

This research paper proposed a new framework or theoretical model, developed based on the JD-R model conducted by Bakker & Demerouti (2017) to adapt the concept and practice of engagement with the human resource management situation in Malaysia context.

Thus, the new engagement theoretical model is modified from the JD-R model by adding new variables, the role of religiosity as a 'moderator' variable as well as existing variables that contribute to the 'job resources' and 'job demands' constructs.

'Religious' dimension will function as an element that is expected to be the catalyst for 'job resources' and 'job demands' constructs, thus affecting the change in the level of engagement among employees. This is in line with the adaptation of human resource management in Malaysia where most of the employees in Malaysia are predominantly religious such as Muslims, Confucian, Buddhist, Hindus, Christian and others (Mansor and Ali 1998).
According to Rowley and Jackson (2010), religious beliefs or practices of a society are among the key elements in the structure of an organization or local institution or state. The need to incorporate these religion 'moderator' variables is seen as important as the findings from the previous study indicates that human resource management and company practices underestimate and ignore religious element in studying human attitudes.

According to (Zuckerman, 2007), despite the fact that at least 85 percent of people around the world have religious beliefs, and 82 percent of them state that religion plays an important role in their daily lives (Crabtree, 2012), the potential link between religious beliefs, management practices and organizations revenue have been clearly neglected in mainstream management research (Mellahi & Budhwar, 2010).

According to (Gruman & Saks, 2011) and (Devendhiran & Wesley, 2017), workplace spiritual aspect and employee engagement are obviously related and influence one another. This is strengthened by the findings of a study on the relationship between workplace spiritual aspect and job involvement in Thailand, where there was a significant relationship between spiritual aspect in the workplace and job involvement (Petchsawang & McLean, 2017).

A study by (Bickerton, Miner, Dowson, & Griffin, 2014) involving 835 Australian religious workers supporting the hypothesis that spiritual aspect can increase job involvement and show low fatigue effects, which ultimately were expected to give positive results to the organization. Relating to engineers, religious factors are seen as important factors in catalyzing engineer’s work commitments (Farrukh, Wei Ying, & Abdallah Ahmed, 2016), making engineers more ethical at work (Spiekermann-Hoff, Korunovska, & Langheinrich, 2018), and subsequently producing engineering concepts with social responsibility and socially responsible (Bielefeldt & Canney, 2016).
CONCLUSION

Spiritual factor and the local beliefs that are being practiced are important in understanding employees' attitude and behaviour in an organization. There is a need to understand the history and culture in the local sense of understanding to comprehend the process, philosophy and problem of the national human resource management model.

Considering that Malaysia is a country with people of various religions and races, it is important for an employee engagement research to include local cultures in understanding the practice of employee engagement accurately. There is also a need to conduct a longitudinal study to show the relationship between organizational engagement and performance and to evaluate the outcome and impact of long-term employee engagement practices and religiosity or spirituality.

SELECTIVE REFERENCES


