The product design preferences based on Kansei engineering: Car products in Malaysia

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Keywords: Product design; Kansei engineering

ABSTRACT— This study discussed the customer preferences towards the product design profiles based on Kansei Engineering. The purpose of this study is to find out what the emotional preferences (Kansei) towards the car design profile using developed questionnaires of Kansei words (Stylish, Comfortable, Safe, Sporty, and Luxury) and 6 car product design (City, Sedan, and MPV) launched in Malaysia for years 2014 – 2016. Based on the finding of the survey distributed to 171 respondents in Melaka, the most customer preferences against the car design are 'Comfortable', 'Luxury' and 'Stylish'. The 'Comfortable' is as the most customer preferences towards the MPV and City car, while 'Luxury' towards Sedan car. The most significant correlation found between car product towards customers were on 'Side' and 'Rear' view of the car, while on 'Front' view is none. The significant correlation to the side view of MPV is influenced by gender, while occupation to the City, and age to Sedan.

1. INTRODUCTION

Nowadays, to develop a new product that very relevant and match to the customer needs and the taste is a critical issue in the product development [1]. This is due to the customer more selective in their choices [2]. They expect the pleasure through fulfilling of their emotions and psychological needs [3]. Thus, the new test for designer and manufacturer is on how to have the capacity that comprehend to what customer like and what will manufacture produces more pleasant product [4]. Consequently, to satisfy this fulfillment should be through an application of emotional method is as progressively concerned to subjective assessment procedure in the product design group [5]. This reason refers to a key variable in choosing whether or not to buy a subjective emotional reaction [6]. Towards this perspective, Kansei is most related to part of affectability, sensibility, feeling, and emotion [7-10]. The purpose of Kansei Engineering is to develop a product that people want to have deeply in their mind and it can be applied to the design of a wide range of product. The main challenge for effective design is to grasp the customer’s effective needs accurately and subsequently to design products that match the needs [11]. By using Kansei Engineering, customer’s requirement can be analyzed using a statistical method and transfer the analyzed data to the design domain. An advantage of Kansei Engineering is the connection an assortment of product properties to product emotions [4].

2. METHODOLOGY

This study started with the data collection related to cars product launched in Malaysia market for years 2014-2016, while 30 words as human emotional expression (articulated in words) about the products are explored and collected from the database (dictionaries, etc.) includes the meaning (Merriam-Webster, Oxford, Longman dictionaries). The survey conducted is using questionnaires with 5 Kansei words towards each type of 6 car design (City, Sedan, and MPV) includes Front, Side, and Rear views.

Kansei Database

Car in Malaysia each 20 Design (of City, Sedan, MPV)

Sorting based on the Highest Chosen by Customer

5 Kansei Words

6 Car Product Design

Kansei Word vs. Car Product Design Preferences

Figure 1 Flow of study.
3. RESULTS AND DISCUSSION

The survey results showed that the product design preferences based on Kansei Words as in Table 1.

<table>
<thead>
<tr>
<th>Car Type Preferences</th>
<th>Brand</th>
<th>View</th>
<th>Kansei Words Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPV</td>
<td>Toyota Alphard</td>
<td>Front</td>
<td>Comfortable</td>
</tr>
<tr>
<td></td>
<td>Toyota Alphard</td>
<td>Side</td>
<td>Comfortable</td>
</tr>
<tr>
<td></td>
<td>Toyota Alphard</td>
<td>Rear</td>
<td>Comfortable</td>
</tr>
<tr>
<td>Sedan</td>
<td>BMW F80</td>
<td>Front</td>
<td>Luxury</td>
</tr>
<tr>
<td></td>
<td>BMW F80</td>
<td>Side</td>
<td>Stylish</td>
</tr>
<tr>
<td></td>
<td>Audi S6</td>
<td>Rear</td>
<td>Luxury</td>
</tr>
<tr>
<td>City</td>
<td>Toyota Etios</td>
<td>Front</td>
<td>Comfortable</td>
</tr>
<tr>
<td></td>
<td>Liva</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peugeot-108</td>
<td>Side</td>
<td>Comfortable</td>
</tr>
<tr>
<td></td>
<td>Toyota Aygo</td>
<td>Rear</td>
<td>Stylish</td>
</tr>
</tbody>
</table>

Based on demographic result, this study also found as follows:
- There were no correlations existed between the Front side views of all car design towards the demography.
- The significant correlation existed were found between car producer preferences towards Rear side views of City car and MPV respectively. While, Rear side view of Sedan is towards brand aspect.
- The significant correlation found towards Side view for age against Sedan, occupation against City car, while gender towards MPV.

<table>
<thead>
<tr>
<th>Description</th>
<th>CITY Car</th>
<th>SEDAN Car</th>
<th>MPV Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>- .534(*)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>.367(*)</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Car Own.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car Producer</td>
<td></td>
<td>- .338(*)</td>
<td>- .370(*)</td>
</tr>
<tr>
<td>Brand Aspect</td>
<td></td>
<td>- .342(*)</td>
<td></td>
</tr>
<tr>
<td>Perception of Good Car.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)
*  Correlation is significant at the 0.05 level (2-tailed)

4. CONCLUSION

The most customer preferences against the car design are 'Comfortable', 'Luxury' and 'Stylish'. The 'Comfortable' is as the most customer preferences towards the MPV and City car, while towards the Sedan is 'Luxury'. The most significant correlation found between car product towards customers were on 'Side' and 'Rear' view of car product design. It is interesting to be noted that gender is having a significant correlation to the side view of MPV, while occupation to the side view of City, and age to the side view of Sedan.

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Echo during classroom teaching and learning

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ABSTRACT – An echo is a sound that is repeated as the sound waves from a surface bounced back to the listeners. It also happens in a classroom, where pre-university of Universiti Sains Islam Malaysia (USIM)’s students are having difficulties in listening skill’s activities in preparing for their Malaysian University English Test (MUET). The condition of the classroom as to perceive good sound quality is the essence of understanding the speech in listening task. It is an integral part of the total learning process, albeit a part that are often ignored. Hence, it is a very significant part to reduce echo in having listening task of learning a second language. On that note, this paper discusses on creating a conducive environment for these pre-university students in their listening skill’s activities in reducing the echo effect. In addition, there are several recommendations that are proposed to combat echo in second language learning classes.

1. INTRODUCTION

Being in a large room with high ceiling, bare walls and hard surfaced floor, one will notice a distinctive ringing sound when speaking. The sound is called flutter echo. When sound waves bounce back and forth between the ceilings, walls and floors, this phenomenon occurs. Echo makes conversation difficult.

In language studies, especially for second language, speaking and listening skill must be conducted in echo-free environment. Today’s English instructor needs to be well versed in current approaches to the teaching of the oral skill. This includes sensitive observation on the set up or conditions of the environment.

In Tamhidi Centre of Universiti Sains Islam Malaysia (USIM), English classes are carried out in a large room surrounded by hard floors and walls. Often, while conducting listening exercises, students complained that they cannot listen well. This study is a preliminary approach in terms of a conceptual plan to overcome this problem.

2. LITERATURE REVIEW

Acquiring good listening and speaking skills in English is the main concern of many second and foreign language learners. Although still somewhat neglected in second language acquisition research, listening now plays a more central role in language teaching. University entrance exam and school leaving tests have begun to include a listening component, an acknowledgement that listening ability is an important aspect of second language [1].

Echo is a sound or series of sound caused by the reflection of sound waves from a surface back to the listeners. If the reflected sound from one syllable is still heard when the next syllable is spoken, it may be difficult to understand what was said [2]. "Cat", "Cab" and "Cap" may all sound very familiar. In examination halls, echo often disrupt students hearing hence leading to lack of comprehension of the exam questions.

Consequently, students of Tamhidi Centre of USIM will have difficulties in answering their listening of the national English examination, Malaysian University English Test (MUET). MUET is made compulsory for tertiary students to pass according to the required Bands (1-6) and programmes registered under universities. In its Listening Test, students are required to listen attentively to five individual recordings in order to answer comprehension questions which are distributed beforehand. The test consists of three parts where the level of comprehension and critical thinking skills increase in each. Listening skills may be deemed as an easy task to conduct but without proper environment, strategies and attention, it could undoubtedly be the hardest skill in a second language acquisition process.

Tamhidi Centre is a pre-university programme offered by USIM, located in Bandar Baru Nilai, a feeder for undergraduate studies in the faculty [3]. After a 2-semester course in Tamhidi Centre, having full-filled all requirements, students will enroll to the Faculty of Science and Technology (FST), Faculty of Medicine and Health Sciences, (FPSK), Faculty of Dentistry (FPg), Faculty of Engineering and Built Environment (FKAB), Faculty of Shariah and Law (FSU) and Faculty of Economy and Muamalat (FEM). Starting from 2016, Tamhidi also feeds a new faculty, the Faculty of Engineering and Built Environment (FKAB).

The classrooms for language teaching in the Tamhidi Centre are DKS1 - DKS6. The classroom is big (14 m × 22 m), and the walls are as high as 6 meters. The original capacity of this lecture hall is for 50 pupils but for various administrative reasons a group of as small as 19 students is occupying this space. Due to this reason, the intensity of echo is high. Hence, students are not able to listen well. It is proposed by one of the Tamhidi Centre language teacher to investigate this problem. A study should be done to prevent echo from
interfering with the students’ audio material. Figure 1 shows how echo is produced by sound reflection through the walls.

Figure 1 Echo effect on listening in language studies.

3. DISCUSSIONS

All building materials have acoustical properties in that they will all absorb, reflect or transmit sound striking them. The surface materials that reflect sound are hard, bare floors and walls. In order to conduct an efficient listening lessons or tests, echo need to be eliminated. The teaching environment itself has to be echo-free.

Echo disrupts communication, but a reverb helps enhance absorption of sound. Reverberation happen when sound is reflected causing a large number of reflections to build up, and then decay as the sound is absorbed by the surfaces of the room. In this case, this sound needs to be absorbed by the students in the classroom. However, reverbation is frequency dependent [4]. For listening task carried out using the DVD player, the sound intensity must be at least 60 dB. Table 1 lists intensity of certain type of sound involved in the classroom.

Table 1 Sound intensity.

<table>
<thead>
<tr>
<th>Type of Sound</th>
<th>Strength (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whisper</td>
<td>20</td>
</tr>
<tr>
<td>Soothing music</td>
<td>30</td>
</tr>
<tr>
<td>Conversation</td>
<td>40</td>
</tr>
<tr>
<td>Shouting</td>
<td>60</td>
</tr>
<tr>
<td>Listening material</td>
<td>80-100</td>
</tr>
</tbody>
</table>

According to Smith [5], choosing suitable material will help in reducing echo. To increase absorption of sound [6], these are several things that can be done to combat echo in language classes, as below:

a. Hanging wall arts, preferably pieces of textile. In the context of DKS in Tamhidi Centre, we might be able to hang curtains at the back wall consisting 4 window panels.

b. Adding bookcase or tall furniture in the classroom. This includes whiteboards that can be used for teaching and learning purposes.

c. Installing carpets on the floors. This will help reduce echo a lot.

4. CONCLUSION

As a conclusion, it is imperative in providing suitable material in forming an appropriate environment that could reduce echo in preparing these Tamhidi Centre students in their listening MUET test. The condition of the classroom is vital as to let the students perceive better sound quality; as it is the core of understanding listening’s activity. The competency of the students in coping with the test as well as making them to manipulate the listening component content by these recommendations would hopefully assist them in performing their listening abilities.

REFERENCES


Challenges in re-engineering the new product development on Bieichi technology
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Keywords: Re-engineering, Bieichi technology, new product development

ABSTRACT – In response to the complexity, time consuming, expensive and risky process in new product development (NPD) process, re-engineering process is being actively pursued by organisations. Therefore, the implementation of re-engineering process been undertaken by changing the traditional way in NPD process where organisation redesign and improve Bieichi technology instead of develop total brand new product. However, to implement this changing, it triggers several challenges to the organisation. Hence, the research aims to identify these challenges. The research used a case study through semi-structured interview sessions with 10 respondents from Universiti Teknikal Malaysia Melaka (UTeM), Syngas Sdn. Bhd., Ministry of Science, Technology and Innovation (MOSTI), National Solid Waste Management Department (NSWMD), Universiti Malaysia Pahang (UMP) and Universiti Teknologi Malaysia (UTM). The finding yielded that, patent and technical knowledge is the most critical challenge in implementation of re-engineering in NPD process. The challenges affected the development and commercialization of Bieichi technology in Malaysia. Future study should examine strategy to overcome these problems in order to increase effectiveness in the implementation of re-engineering in NPD process.

1. INTRODUCTION

Product development is one of the important activities in an organisation. Most of the organisation tend to develop new product frequently due to the hyper competition, technological advancement, market changes and product life cycles that occur in the market [1]. Moreover, with tremendous demand from customers regarding their problem in daily life, organisation force to develop new technology that can solve customer problem. Therefore, New Product Development (NPD) always be employ for develop new technology from an idea or opportunity into a successful market launch [2].

In reality it is not easy to develop and commercialise new product. It will take many years to design, develop and launch new products to the market [3-4]. Moreover, with high competition in marketplace nowadays, past paradigms will not work. Therefore, there is a need to reduce product development time and resources, increase speed and also maximise windows of opportunity for new product [5]. Hence, in response to these problem, re-engineering of existing process is being actively pursued by organisations.

The re-engineering process can be define as the fundamental rethinking and redesign of existing process in order to achieve improvement in term of performance such as cost, speed, quality and service [6]. The implementation of re-engineering process in NPD process can be implement by changing the way organisation develop new technology into the market. In other word, the organisation just redesigns and improve existing product instead of develop a total brand new product. Thus, by implement this process it will help to increase productivity and to reduce development time in the market.

However, the implementation of re-engineering in NPD process is usually a stressful and painful task to the organisation. The re-engineering concept will change the old method from develop new product. As a result, it will increase the probability of failure as organisation seek. This based on the previous literature shows that 60% - 70% of re-engineering process was failed and not achieved dramatic results company seek [6-7].

So, there is a need to study on the challenges when implementing the process of re-engineering in NPD process. In order to show how these challenges will affect the NPD process, this research will analyse in term of development of clean technology in Malaysia. It originally from Japan which is Bieichi technology (refer to Figure 1). Bieichi technology is a clean technology where this technology can convert different types of plastics such as poly propylene (PP), polyethylene (PE) and polystyrene (PS) into crude oils [8]. Moreover, these crude oils can be processed again using heating process to produce gasoline, diesels, kerosene, and heavy oils [9].

Figure 1 Bieichi technology.

This research chose Bieichi technology instead of other technology because of the awareness to reduce...
negative effect from plastics waste. Based on previous literature [10], the un-controlled management of plastics waste caused negative effect to human health, ecological, and environment. Hence, by developing clean technology especially Bieichi technology will convert plastic waste into fuels. It will help to reduce the negative effect of plastic wastes in Malaysia.

As a conclusion, by knowing what experts believe in this study, it will increase the effectiveness in the implement of re-engineering in NPD. The result will predict the challenges that faced by the organisation and at the same time will help to educate society to manage their plastics waste efficiently after use.

2. METHODOLOGY

Data were collected using qualitative method through semi-structured questionnaire interview. Semi-structured questionnaire interview can be defined as an informal interview, where the researcher used this method to explore in depth of a general area in which the researcher interested and start asking related questions and carefully listen to the answers and able to explore further [11]. There are 10 respondents were chosen from UTeM, UMP, UTM, MOSTI, NSWMD, and Syngas Sdn. Bhd. Table 1 shows the list of respondents:

Table 1 Background of respondents.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Organisations</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UTeM</td>
<td>Deputy Dean (Academic)</td>
</tr>
<tr>
<td>2</td>
<td>UTeM</td>
<td>Senior Lecturer</td>
</tr>
<tr>
<td>3</td>
<td>UTeM</td>
<td>Senior Lecturer</td>
</tr>
<tr>
<td>4</td>
<td>UMP</td>
<td>Senior Lecturer</td>
</tr>
<tr>
<td>5</td>
<td>UTM</td>
<td>Senior Lecturer</td>
</tr>
<tr>
<td>6</td>
<td>NSWMD</td>
<td>Administrative Assistant Secretary</td>
</tr>
<tr>
<td>7</td>
<td>NSWMD</td>
<td>Administrative Executive</td>
</tr>
<tr>
<td>8</td>
<td>Syngas Sdn Bhd</td>
<td>Sales Executive</td>
</tr>
<tr>
<td>9</td>
<td>MOSTI</td>
<td>Executive 1 for Commercialisation</td>
</tr>
<tr>
<td>10</td>
<td>MOSTI</td>
<td>Deputy Secretary of Industry Division</td>
</tr>
</tbody>
</table>

3. RESULTS AND DISCUSSION

Previous literature discussed that there have four critical challenges to redesign and improve existing technology instead of developing new technology. Patent challenge, technical knowledge challenge, market challenge and resources challenge are critical challenges that organisation will face in this process [3,12-14]. However, the researcher found that patent and technical knowledge become critical challenges to this process. This is because the challenges always been mentioned by most of the respondents. This result is slightly different from previous literature.

The technical knowledge challenge occurs because of inexperience of the technology developer toward the technology [13]. In order to develop and redesign existing technology, it requires full and detail information on how the technology being operate. However, due to inexperience of the technology developer toward the technology, it is difficult for the developer to develop the same technology. Thus, the technology developer cannot develop and modify the technology during product development. Hence, all of the respondents agreed this challenge is a critical challenge to the implementation of re-engineering in NPD process especially in redesign Bieichi technology. Respondents also agreed that, without the technical knowledge, product development team cannot develop the product and it will interrupt the development process. Therefore, the organisation need to solve this problem before product development being conducted. In summary, technical knowledge is one of the critical challenge in implementation of re-engineering in NPD. Hence, this challenge can slow down the redesign and improvement of Bieichi technology in Malaysia.

Next, for patent challenge it occurred because of the application of know-how in commercial application [13]. The patent holder, have a right to protect their technology from infringement. Therefore, it will be an issue if other organisation develop same technology without get authorization from patent holder. Respondents 1 – 5 agreed this challenge will be critical issue in redesign and improvement of Bieichi technology in Malaysia. Respondents 1- 5 stated that, if Blest Corporation register Bieichi technology in Malaysia, other organisation cannot commercialize technology like Bieichi in the market. Respondents 4 and 5 mentioned that, it will be a disadvantageous to the organisation because the organisation has invest to develop the product. However, the organisation cannot commercialize the product into the market. Based on the interview, patent challenge will affect the implementation of re-engineering in NPD process by preventing the organisation to develop and redesign Bieichi technology in Malaysia.

4. CONCLUSION

The implementation of re-engineering in NPD process is suitable to reduce product development time and resources, increase speed, and also maximize windows of opportunity for new product. At the same time, to implement re-engineering is usually stressful and painful to the developer. Hence, this research study challenges in implementing of re-engineering in NPD process. The result yielded that technical and market challenges is the most critical challenges to this process. Therefore, these challenges will affect the development of Bieichi technology in Malaysia. As a conclusion, future research should identify strategies in order to overcome these challenges.

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The need for integrating communities of practice and mobile learning for digital literacy development

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Keywords: Digital literacy; mobile learning; communities of practice; ISTE; education technology

ABSTRACT – In the modern world, digital environment has become so empowering that computers and other digital technologies have become such a basic part of life. As such, being digitally illiterate is no longer an option; it is deemed to be a necessity in education, workplace, and for every internet user. To prepare themselves for the challenges in the workplace, higher education students need to develop their digital literateness. An integrated concept of Communities of Practice and Mobile Learning is proposed as a pedagogical model to improve students’ digital literacy mirroring the criteria of the International Standards of Technology in Education.

1. INTRODUCTION

Focusing on the intersections of literacy and technology in the lives of Higher Education Institutions’ undergraduates, this paper aims to provide an understanding and appreciation on the integrated concept of Communities of Practice (CoP) with Mobile Learning (ML) for the purpose of developing HE students’ digital literacy (DL). In doing so, it seeks to disclose the implications and benefits that this understanding has for taking up DL practices in formal and informal learning environments in HEIs.

The problems faced by HEIs undergraduates nowadays are concerning their transition from school to work. According to surveys, graduates are lacking basic skills to get by in the workplace, thus the blame was instinctively placed on education system and schools as being inadequately meeting the demands of industry [1]. The mismatched between literacy skills needed at the workplace, and the ones offered by HEI has prompted to the spending of billions of dollars by the industry on employee training programs “so that all will be able to perform their jobs better if they are technologically literate” [2]. Due to the digital literacy gulf that exists between education and employment, there is a need for HEI to fulfil the gap with literacy skills much needed in the workplace.

The International Standards of Technology in Education, which is a renowned association focusing on educational technology integration has laid out the 2016 ISTE Standards for Students stressing on the skills and qualities for them to be successful in a connected, digital world so that they could become empowered learner, digital citizen, knowledge constructor, innovative designer, computational thinker, creative communicator and global collaborator [3]. The whole of these standards are interrelated and overlap with each other in ways that boost their power to transform education technology. The latest review of ISTE standards released in 2016 is for the intent of providing a framework for intensifying digital age learning among students. One of the major trends which prompted the latest update is for the reason that broadband and mobile device access has increased in schools; which denotes the growth of ML. ISTE has always been devoted to ML as educators nowadays are leveraging ML to improve student engagement, peer interaction and collaboration, to collect classroom feedback, reduce computer costs, and extend the place and time of learning [4].

Koole’s Framework for the Rational Analysis of Mobile Education [5], defines ML in terms of three distinct aspects: device, learner, and social, and what occurs at the intersections of these aspects. It defines ML as a result of mobile technologies convergence, human learning capacities, and social interaction and it is suitable for guiding the development of future mobile devices, learning materials, and the pedagogy of mobile education. He states that key defining features of ML are that it “… provides enhanced collaboration among learners, access to information, and a deeper contextualization of learning.”

Thus, referring to Figure 1, the highlight of this paper is on the Social Aspect (S), Learner Aspect (L) and intersection of both; namely Interaction Learning (LS). There are three criteria of LS; interaction, situated cognition and learning communities [6]. One of the concepts of learning communities is Communities of Practice (CoP). This concept effectively provides an enhanced cognitive ML environment in which distance
learners can interact with their instructors, peers, course materials, or even their physical and virtual environments.

Utilising Wenger, McDermott, and Snyder’s viewpoint on the theory of CoP, it is deemed as the ideal concept to fulfill the demands for social learning opportunities [7]. Three characteristics indispensable to the framework of CoP; domain, community, and practice can be regarded as nothing less than perfect in supporting the pillars of ML (refer to Figure 2). Furthermore, CoP is in support of ISTE standards as collaboration within social interactions make ways for problem solving, negotiation, active participation, and improve learning outcomes.

Digital literacy has become an essential skillset for mediating life these days. Integrating the concepts of CoP and ML could develop HEIs students’ digital literacy skills, thus would adequately prepare them for the competitive and dynamic work environment. Sharpe and Beetham’s framework [8] describes four stages of digital literacy development, from the lowest level soaring upwards; access to skills, to practice, and on the highest top is identity. Synchronizing this development process with the integrated ML-CoP framework, a proposed combined research model which could promote education technology to a higher level is depicted in Figure 3. The model syndicates these constructs in a hierarchical structure as to imply that the growth of one’s digital literacy to the higher levels is impossible without the occurrence and support of the levels below; e.g. digital skills cannot be developed without the prerequisite to access of technologies, and this development process could be enhancing further by the existence of suitable context and domain. The combination of all the constructs from ML; social, learner, and interaction learning (context), CoP; domain, community and practice, and DL; identity, practice, skills and access, when integrated with formal or informal learning environments would support HEI students’ digital literacy growth as it motivates learners to develop new skills and practices in different situations.

CONCLUSIONS

This study seeks to contribute to the body of research by initiating a new integrated model of CoP and ML as a practice by students in HEI in order to develop their DL. This integrated model could trigger to positive change as it could become a bridge between formal and informal practices, thus creating more prepared and sophisticated students equipped with innovative and dynamic tools for problem solving. In a sense, it prepares students for the realities of the social world.

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ABSTRACT – Hitherto, students must develop long life learning and self-learning skills to reflect advanced technology. Problem-based learning (PBL) approach is an innovative technique that engages learners for deep learning, and develops crucial professional skills, especially self-directed learning and problem solving. ICT is a tool for PBL implementation. This study developed MOOC integrated PBL learning model in enhancing soft skills. ADDIE design model was used as the basis. The model is expected to induce creative and active participation from learners which subsequently trigger technical competence and soft skills. Future study should focus on the implementation of this model in classroom.

1. INTRODUCTION

Soft skills are vital in today’s workforce. Employers demand skills like critical thinking, risk-taking, adaptability and flexibility. Nowadays the technologies change rapidly which require students to develop long life learning and self-learning skills to reflect advanced technologies. The industry demands technical competence and soft skills which are lacking among many Asian employees and job candidates. The Manpower survey [1] reported that candidates fall short of employer expectations in regard to a lack of flexibility, adaptability, enthusiasm and motivation. In addition, a survey by Cegos Group [2], primarily among Generation X Singaporeans – ‘Leading & Managing in the 2020 multi-dimensional workforce’, found that the three most vital skills leaders need today are the ability to manage change – 79%, negotiation and conflict resolution skills (68%), and collaboration skills (68%). Problem-based learning (PBL) approach is an innovative technique that engage learners for deep learning, and develop their crucial professional skills, especially self-directed learning and problem solving. ICT is a tool for PBL implementation. The main focus is integrating the ICT components like MOOC as a tool for PBL learning environment.

Both MOOC and PBL are essential to elevate the acquisition of knowledge and skills. Problem-Based Learning (PBL), an educational strategy, is driven by a problem and students work collaboratively to explore the problem in depth, conduct independent learning, share information in groups, apply presentation and writing skills as well. Lecturer acts as a facilitator to scaffold the learning process. Lecturer plays the role of a facilitator and motivator to guide students along the learning path [3]. PBL is proven effective in various domains globally [4-5]. Problem-based learning (PBL) is an interactive instructional approach and has gained prominence as a way of instruction in various disciplines like medicine, engineering and education among others [6-9]. The benefits of PBL include critical and creative reasoning, communicating and interacting in productive collaboration as part of a team, appreciating alternative viewpoints, making reasoned decision, self-evaluation and self-directed-learning [10]. PBL induces effective adult learning such as active learning, integrated learning, cumulative learning and learning for understanding. Various PBL models are used by many scholars. 5 Ladders is used extensively as a PBL model. The discussion revolves around the triggers used, procedure and reflection [11].

Multimedia technologies are to support PBL which is based on real world issues and problems. MOOC is an online open class for mass education based on web-service. MOOC is able to change higher education realms. Yet, the literature around MOOCS is still scarce to measure its effectiveness [12]. In developing countries, MOOC is still in its infancy stage. A study [13] on MOOC for Mandarin in Malaysia yields that to sustain Mandarin MOOC is through creating usable content for MOOC and improving the internet connection. In a nutshell, with the advent of technology-rich teaching, ICT prepares the platform for planning, information gathering, organizing, presenting and measuring performance.

This study aimed to develop MOOC integrated PBL learning model in enhancing soft skills. ADDIE design model was used as the basis.

2. METHODOLOGY

Content Analysis and Focused Group Interview were utilized in this study. While content analysis involves perusal of subject and web materials, Focus group consists of Lecturers of a course. ADDIE instructional design model was utilized in designing the teaching model. The ADDIE Instructional Design Model has 5 phases as follows.

• The Analysis Phase – analysing the needs and constraints for training. Choosing learning environments and the learning objectives and new skills to be learned and the learners’ current level. (Interview with experts)
• The Design Phase – outlining strategies/blueprint to be used to reach the instructional goals; content, subject matter experts, user experience, assignments, tests, graphics and media. (Interview and Content Analysis Method)
• The Development Phase – creating the course which is aligned with the blueprint from the Design Phase.
• The Implementation Phase – implementing the course.
• The Evaluation Phase – measuring the effectiveness and efficiency of the training. Formative and summative approaches are used.

3. RESULTS AND DISCUSSION

A model was designed based on the interview with the experts and content analysis conducted on the subject materials and documents. The design phase consisted of strategies to be adhered to in the development phase later. Figure 1 shows the learning model for the MOOC integrated PBL.

3. CONCLUSION

In conclusion, this study designs a MOOC integrated PBL learning model in enhancing soft skills utilizing the ADDIE design model. The model is beneficial for tutors, policy makers and administrators of MOOC and PBL. Future study should focus on the implementation of this model in classroom.

REFERENCES

Studies and design downdraft gasification for teaching and learning in UiTM Penang branch

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Keywords: bBiomass; downdraft gasifier; design

ABSTRACT – The biomass downdraft gasification is an old technology, but it still can be used as an alternative way to substitute the conventional energy source. Currently, the interest in such technology is increasing due to the increase of fuel prices and the global warming problem. Producer gas, produced from biomass gasification process can be used to generate power and electricity. However, the inefficiencies in the technology make the biomass gasification uneconomical. Thus in this paper, a highlights of several years downdraft gasifier experiment activities is carried out. The conclusion has been determined where the method of teaching and learning directly in the laboratory is needed. A laboratory scale downdraft gasifier is designed to ensure the success of this learning process.

1. INTRODUCTION

In 2016, renewable energy sources represented 18% of all global consumption of primary energy, and 10% corresponded to biomass. The use of forest biomass and agricultural or animal residues as a source of energy is an important part of sustainable development policies in developed and emerging countries that will contribute to lower their energy dependency on fossil fuels and in such a way reducing greenhouse gasses emissions. One of the technically feasible ways to convert the biomass into fuels is the gasification [1].

Gasification is a process of converting carbonaceous materials (through incomplete combustion at temperatures of more than 1000°C) to combustible gases consisting of carbon monoxide, hydrogen, carbon dioxide and small amounts of methane gas. This gas mixture is commonly known as a ‘producer gas’ or ‘syngas’[2-4].

The biomass gasification is an old technology, but it still can be used as an alternative way to substitute the conventional energy source. Currently, the interest in such technology is increasing due to the increase of fuel prices and the global warming problem. Producer gas, produced from biomass gasification process can be used to generate power and electricity. However, the inefficiencies in the technology make the biomass gasification uneconomical. The power loss called de-rating of the engines fuelled by producer gas-air mixture is found to be around 15% to 30% in CI engine and 20% to 40% in SI engine. The power de-rating is cause due to lower heating value of the producer gas-air mixture from biomass gasification process.

Thus in this paper, a highlights of several years downdraft gasifier experiment activities is carried out. The conclusion has been determined where the method of teaching and learning directly in the laboratory is needed. This learning process will be done to a group of students to a deep understanding of the process of energy production by the downdraft gasifier. A laboratory scale downdraft gasifier is designed to ensure the success of this learning process. In the future, it is expected that the problem of de rating power loss can be solved due to a clear understanding of the gasification process and will directly improve the previous producer gas quality.

2. METHODOLOGY

2.1 Research activities

Works on biomass renewable energy has been done since 1998 by bio-energy research group in School of Mechanical Engineering, USM. The main research is on the combustion characteristics of the downdraft gasifier and the performance of the IC engine. The engine mostly used for the research is diesel engine. It is because diesel engine can be run with producer gas in a ‘dual fuel’ mode with minor modification [5].

2.2 Experimental set-up

The 5 kW single cylinder direct injection, Yanmar diesel engine on dual fuel mode of operation coupled with a 10 kg capacity downdraft gasifier was used. The small blocks of furniture wood were used as biomass fuel. The producer gas flow rate was set to 80 L/min and 100 L/min, and engine was set at 2000 and 2400 rpm with 20%, 40% and 60% load. The engine was coupled to the dynamometer to measure the performance of the engine.

The second activity was done using 50 kg capacity downdraft gasifier and 20 kW direct injections Perkins diesel generator engine connected to an electrical load bank in the dual fuel mode operation. The 50-100 mm cubes off cut furniture wood were used as biomass fuel. The various flow rate of producer gas between 40–80...
Nm³/hr was used, and engine was set at constant 1500 rpm with loads of 9, 12, 15 and 18 kW. Figure 1 show overall view of the downdraft gasifier set up.

![Figure 1 Downdraft gasifier.](image)

3. RESULTS AND DISCUSSION

In dual fuel mode operation of 10 kg capacity downdraft gasifier, the maximum diesel replacement was recorded as 60%. From the the graphs of the thermal efficiency (BTE) versus the brake mean effective pressure (BMEP) of dual fuel mode, it can be seen that the BTE for diesel fueled producer gas was 36-41% lower than diesel alone at 2000 rpm and 2400 rpm, respectively [5]. A similar trend also found for these two graphs. The phenomenon was due to higher mass of fuel which results of rich mixture, thus lead to incomplete combustion in the engine’s cylinder.

For 50 kg capacity downdraft gasifier experiment, the maximum diesel replacement was recorded as 80% at 12 kW load. The efficiency of engine was dropped in dual fuel mode. It was found that the engine efficiency for various loads with producer gas dropped haft compared to the diesel alone. This phenomenon was due to lower flame speed of the combustion for diesel fueled producer gas compared to diesel alone.

In terms of combustion analysis, it can be seen the most possible reason why the power de-rating was observed is due to lower heating value of the producer gas-air mixture from biomass gasification process.

The lab scale downdraft gasifier has been designed and shown in Figure 2 in assemble exploded view.

![Figure 2 Overall lab-scale downdraft gasifier design.](image)

The construction features consist of hopper, throat, combustion zone, lower cone, reduction zone and distributor grate plate. The downdraft gasifier was developed for the laboratory scale purpose. The overall height of the downdraft is 540 mm. The inner diameter of the hopper is 200 mm and the outer diameter is 210 mm. The height of the combustion zone is 50 mm and the distributor grate plate has seventeen small holes to allow ash to flow out. The downdraft is made from mild steel to detain high temperature operation around 1100°C. Have been reported [6] that the gasifier made of austenitic steel is reported to have shorter life compared to gasifiers lined with ceramic material. This is because gasifier made of steel failed at the throat and air nozzle region due to high temperature oxidation and corrosion mostly within 1500 hours of operation whereas the gasifier lined with ceramic material could withstand thermal shock. Mild steel has been chosen because its melting point at atmospheric pressure is between 1480-1526°C.

4. SUMMARY

A study of the downdraft gasifier technology based on several years activities and current works on the design of the lab scale downdraft have been carried out. The inefficiencies on the heating value of the producer gas has been presented. The design of the lab-scale downdraft gasifier has been done due to lower heating value of the producer gas from biomass fuel and the power de-rating of Diesel engine. The downdraft gasifier will be fabricated in next stage of the studies and will be tested. The output producer gas is expected to have a good combustible gases composition. Therefore, teaching and learning to understand about the detailed operation of biomass gasification such as downdraft gasifier can be done. This process will help to overcome the inherent problems such as de-rating of power loses of the diesel engine in the future.

REFERENCES


Online threaded discussions for limited English proficient undergraduates: instructor intervention

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Keywords: Threaded discussions; limited English proficient; intervention

ABSTRACT – The immersive computing environment today has spawned various technology-enabled activities in language classrooms such as online threaded discussions. This paper aims to explore how engineering undergraduates of Limited English Proficiency (LEP) interact in threaded discussions and investigate the instructor’s point of view on instructor intervention in the activity. The postings of the 15 LEP undergraduates were analyzed for emerging themes. Findings indicate that they mainly asked questions. Their discussions lacked substance and were akin to ‘educationally less valuable talk’ (ELVT). The instructor’s intervention as the main content provider was critical to motivate them and to keep their discussion in track.

1. INTRODUCTION

Interaction, collaboration and learning via discussions are prominent in language teaching and learning, particularly in higher education. Pervasive expansion of new communication technologies has enabled instructors to supplement traditional face-to-face discussions with activities like asynchronous discussions where communication is delayed by hours or day as in Facebook or threaded discussions.

Threaded discussion which refers to online discussion of postings about a topic has been defined as a great classroom tool which allows the learner to be engaged with the environment, collaborate with other learners, resources and experts as well as reflect, formulate ideas and produce thoughtful experiences [1]. Contrary to this [2], [3] found in their studies that students who participated in threaded discussions tended to collaborate with their peers in a very ‘academic’ and less personal and motivating tone and thus the element of community was missing.

[4] compared 37 studies on the use of threaded discussions and it is interesting to note in the study that although many out of the 37 studies had frequently mentioned about instructor efforts, there were not many that had focussed on instructor involvement and effort. On the contrary, a brunt of the research [5-9] had focussed on students’ participation. Besides, most of the past research on threaded discussions have been quantitative in nature and as mentioned by [4] there is a need for research that calls for qualitative data, particularly from the point of view of the online instructor. It was also found that students enrolled in technical disciplines were more accustomed to the didactic lecture approach and were taught correct procedures but not how to discuss issues and procedures.

Thus, this study aims to explore how undergraduates of (LEP) interact in threaded discussions as well as to investigate the point of view of the language instructor about the involvement of the instructor in the discussions.

2. METHODOLOGY

The study involves 15 LEP engineering undergraduates from the Faculty of Manufacturing Engineering. These three year undergraduates who have a Band 1 and 2 in the Malaysian University English Test (MUET) were takers of the course on English for Professional Communication. According to the MUET band description, candidates with Band 1 and 2 are limited users with a poor and limited command of the language respectively. This course which includes topics related to job interview, group discussions and oral presentations is meant to prepare them for their future workplace.

A website with the URL http://www.developoralcommunication.com was developed specially for this group of students and they were required to communicate with each other by posting their comments to topics posted by the instructor. This supplementary out-of-class activity was conducted after the students had been exposed to topics on group discussions, interview strategies and oral presentations. The participants’ conversations in the website were analyzed qualitatively according to themes that emerged. The instructor’s point-of-view on the discussions were also recorded.

In the teaching and learning of topics on group discussions, job interview and oral presentation, the participants were involved in threaded discussions in http://www.developoralcommunication.com website that were based on the following topics:

1. The problems I face when I participate in a group discussion and steps to be taken.
2. Ways to win an interview.
3. How can I improve my oral presentation?
4. Am I prepared for oral communication at the workplace?

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3. RESULTS AND DISCUSSION

The analysis of the postings in the threaded discussions revealed some emerging themes that include ‘asking questions, commenting on others’ opinions and advising. For example, in the threaded discussion on ‘How to win an interview’, they were found to be practically ‘asking questions only’. They never attempted to advice or comment. In the context of this study, although the participants had been exposed to strategies on answering job interview questions, being LEP learners, they had not attained a level where they could advice, comment and to be critically engaged in the discussions and therefore, the instructor had to intervene so as to keep the conversation going as in the print screen below.

Figure 1 Part of the threaded discussion on ‘How to win an interview’.

Generally, although the participants had interacted by advising or providing opinions in several postings, it was in fact minimal and most often the postings lacked potential educational value and contribution to the knowledge of the subject matter. This finding concurs with [10] who assert that this type of talk becomes the most troubling issue in threaded discussions. [10] have indeed provided strategies to achieve Educationally Valuable Talk (EVT). To overcome this issue, [11] has introduced the A.V.I.D. approach to question design. The four parts of this acronym refer to A (active), V (varied), I (interesting) and D (open-ended). Creating discussion questions based on this approach has been found to promote discussions that are engaging for participants.

According to the instructor’s point of view, instructor intervention was necessary especially when there was a pause or when the discussion was less satisfactory. It was also stressed that instructor involvement is very crucial to motivate the discussion as well as to provide valuable feedback. The instructor had not implemented the ‘laissez faire’ approach as ‘a guide on the side’. Instead, the instructor had been the content provider at most times as the LEP learners needed more assistance. The instructor’s opinion parallels [12] who stresses on the role of the instructor as a cheer leader who would intervene and motivate the students to keep the discussion in track.

4. CONCLUSIONS

Although the participants’ postings lacked valuable ‘substance’ related to the topic, it is important to note that the threaded discussions have provided the LEP learners with the motivation and autonomy to socialize and facilitate collaborative and comprehensible interaction, thus contributing to a reduction of their shyness and anxiety. An evaluative case study conducted by [13] highlights the potential benefits of asynchronous threaded discussions in enabling student sojourners to adjust themselves as in keeping them engaged in an unfamiliar environment. In the present study, the participants’ collaboration with their peers as well as their instructor has enabled them to advance their Zone of Proximal Development. Instructor intervention has also fostered greater collaboration among the participants and had kept them motivated and engaged in the discussion.

REFERENCES


The effectiveness of online project based collaborative learning towards total number of postings

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Keywords: Online project based collaborative learning; learning management system, Facebook

ABSTRACT –This study evaluates the effectiveness of Online Project Based Collaborative Learning towards Total Number of Postings. OPBCL was developed by integrating Moodle forum with Facebook function and using project based learning approach. A quasi-experiment was conducted with two classes of polytechnic students for eight weeks which involved 54 students. Data were obtained using Online Discussion Transcript using OPBCL and CIDOS forum. All collected data were analysed using SPSS 19.0 software. The findings indicated that students were participated more using OPBCL platform compared to CIDOS platform, and this was reflected in the difference in the total number of postings. OPBCL has shown to be a better learning platform that can promote students' interaction in terms of easy access and instant notification.

1. INTRODUCTION

A learning management system (LMS) which is also known as Course Management System (CMS) or Virtual Learning Environment (VLE) is a software application or Web-based technology that is used to plan, implement, and assess a specific learning process [1]. Typically, an LMS provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance. It integrates a range of functions for teaching and learning activities. LMS makes interaction between learner-instructor and learner-learner more convenient. Each institution has its own Learning Management System (LMS) to manage the learning environments. LMS provides communication and collaboration that are featured in discussion boards or forums. However, LMS has been reported to be incapable of supporting interaction and communication [2–4]. Therefore this has led educators to utilise other applications as a replacement for a built-in discussion forum in LMS such Social Networking Sites (SNSs) [3], [5].

Even though many researchers in the field of education have looked into the potential of adapting SNSs in their teaching and learning process [6–8], various studies have focused on the integration of conventional LMS such as Moodle with SNSs. This has left a gap in the body of knowledge on how SNSs can be integrated into LMS platform to facilitate Online Collaborative Learning (OCL). Therefore, with the availability problem as stated, then the study to propose effective online learning environment that can facilitate Collaborative Learning (CL) is significant. This study proposed Online Project Based Collaborative Learning (OPBCL) by integrating LMS forum with Facebook function and using project-based learning approach. Therefore, this study aims to evaluate the effectiveness of OPBCL towards total number of postings.

2. MATERIALS AND METHODS

This study has been divided into three phases which are (i) Analysis; (ii) Design and Development; and (iii) Implementation and Evaluation. In the analysis phase, all factors and elements that affect the effectiveness of Online Collaborative Learning (OCL) were identified through document review and validated by experts [9–10]. At the end of this phases, an OCL model was proposed [11]. In the design and development phase, OPBCL was designed and developed based on the proposed model [12]. OPBCL was developed by integrating Moodle forum with Facebook function and using project-based learning approach. In the implementation and evaluation phase, pilot study was conducted in order to ensure instruments are valid and reliable. Furthermore, a quasi-experimental method will be conducted to obtain the data needed for this research.

A total of 54 students who were takers of the Nutrition subject in the December 2014 session from Polytechnic Merlimau Melaka were involved in this study. Data were obtained using Online Discussion Transcript using OPBCL and CIDOS forum. Student’s online discussion script was examined to determine the total number of postings. Only messages can assess
student’s soft skills will be counted as total number of posting. Furthermore, Perception of Online Collaborative Learning Questionnaire (POCLQ) was distributed to both group to evaluate student’s perception towards the platform used to complete their project. All data is analysed using SPSS 19.0 software.

3. RESULTS AND DISCUSSION

A data distribution test was conducted to determine the subsequent analysis method [13] and it is needed despite the small sample (n=30) always pass normality test [14]. According to K-S test (n < 2000) the total number of postings and it showed non-normal distribution. Meanwhile, the perceptions’ questionnaire showed normal distribution. Field [15] recommended on transforming the non-normal data to achieved normality but Wang [16] was against this recommendation with the reason that the transformation can result in a complex interpretation of the results. Therefore, Saiyidi [13] recommended on the use of non-parametric test for the method of analysis. This study used the non-parametric test (Mann Whitney) as a method of analysis based normality test findings.

![Figure 1 Total Number of postings.](image)

Figure 1 shows that a significant difference exists among the students’ interactions based on the total postings \[U = 190.00, z = -2.79, p < .05\]. Based on this information, it has been revealed that the students of the Treatment group which participated using OPBCL platform (Mean Rank =32.24) posted more than the Control group which merely participated using CIDOS platform (Mean Rank = 20.05). Therefore, it can be concluded that the use of OPBCL platform increased the students’ interactions in terms of the total number of postings in comparison to the use of CIDOS platform.

Similar findings was reported by Schroeder and Greenbowe [17] where students who participated in discussion using Facebook more frequently posted their comments compared to those using the LMS. Active participation by students in the learning process can lead to CL occurred. These findings are also supported by Ada [18] and Beer et al. [19], in which it was found that the increase in the total number of postings increases students’ interactions in discussion progress.

Meanwhile, Figure 2 shows that significant difference exists in the perception towards Learning Environment construct the Learning Environment \[U = 224.50, z = -2.41, p < .05\]. It has been revealed that Treatment group which participated using OPBCL platform (Mean Rank = 31.20) had a higher mean rank than Control group which participated using CIDOS platform (Mean Rank = 21.69). Therefore, it can be concluded that Treatment group portrayed better perception of the OPBCL platform than Control group perception of the CIDOS platform.

It is also evident that OPBCL platform is better in terms of usability, stability and accessibility. The learning environment provided by OPBCL encourages students to participate actively in group work. Supportive learning environment can encourage student participations. This finding supports the findings of research question 6 where the total number of postings in OPBCL platform is higher than CIDOS platform. This proves that OPBCL can provide a better online learning environment.

![Figure 2 Comparison between Control and Treatment Group on POCLQ.](image)

4. CONCLUSION

This study attempted to evaluate the effectiveness of OPBCL towards total number of postings. The difference in the total number of postings between Control and Treatment groups is caused by the integration of SNSs function, meaning Facebook in OPBCL platform which facilitated OCL. These findings are also consistent with the studies by Hern’dez et al. [5] and Ozmen and Atici [20] who have stated that the current LMS is insufficient to support social interaction, resulting in low student participation when using the LMS platform. Hewit [21] believed that the way a forum is facilitated will affect the students’ active participation. Therefore, previous studies have recommended that current LMS are integrated with SNSs function [22-27]. The integration of LMS with Facebook function in OPBCL platform provides a better learning environment in terms of usability, stability and accessibility. OPBCL has proven to be a better learning platform that can promote students’ interaction in terms of easy access and instant notification.

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Modelling sustainable performance of SME through green management implementation in the new economic transition

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Keywords: Sustainable; resources; strategy

ABSTRACT – Green management has been synonym with large companies but maybe not for small medium enterprises (SME). Because SME existence must be relevance with the future growth of the green economic, it challenged them to transform into green companies to achieve green products compliance. Hence, the paper attempted to discuss the major influences on the SME to realize a sustainable performance. In order to diverge from conventional products, it was crucial to identify the new attributes for their existing business conduct. Organizational resources should be fully utilized to focus on manufacturing processes that abide by the green principles. The built-in of sustainability concept around the business ecosystem has also become important and inevitable. Ultimately, the research outcome demonstrated that significant improvement of SME activities were necessary to preserve the Mother Nature and our future generations’ survival. As a result, the new economic transition reflected the SME readiness to adopt new strategies that accomplish competitiveness. Overcoming the current economic setback must be in-line with the performance of a sustainable business.

1. INTRODUCTION

The propagation of green policies by governments, international agencies or their joined forces on a range of green initiatives has helped re-launched global economic growth with business ecosystem remained as a top priority, stressed Bina [1]. When Malaysia endorsed its National Green Technology Policy (NGTP) on the 24th July 2009, small medium enterprises (SME) were somewhat relief but anxious to learn how the green economic agenda could benefit their business. According to Barath [2], this is important since failure of the world’s financial system revamp has furthered the economic downturn that severely affecting many business and individuals. Green management emerged at the right time mainly to help enterprises to focus their attention on how to “go-green”. It tries to put the environmental issues as a major responsibility of every business. Enterprise’s responses have triggered the governments to analyse what should be provided in order to make SME business moved toward sustainable development as emphasized by Schaper [3],[4]. In term of their operations, the study by Chin et al. [5] has identified environmental collaboration as a main relational capability for the formulation and execution of new strategies. It could also be appropriate to look for other performance indicators (besides financial) to measure the business growth. Different benchmarks to enhance SME’s innovation and creativity might be used to quantify their effectiveness as suggested by Seeberg & Monauni [6]. Apart from that, it was obvious that each industry is now facing its own unique challenge due to the change and variety of green consumer expectations. Thus, D’Souza et al. [7] asserted that the change of business process might lead to increase market shares in green products. New tool to market new products like using the social media would be able to create attention, interest, desire and action from the stakeholders, mentioned Hassan et al. [8]. In a study conducted in Malaysia, the small medium-sized companies still hold a rhetoric that they were unlikely to cause an environmental impact as argued by Yacob et al. [9]. Such thinking was certainly not welcome. SME must be prepared to adopt relevance strategies given that their business establishment is the largest in the country. At different rate of success, green strategy would be expected to create a huge business opportunity that assured their future sustainable performance.

2. METHODOLOGY

The survey instrument for this research used a five-point Likert scale. The questionnaire was reviewed by 2 business representatives and 2 academicians where modifications were done based on their feedbacks. A pilot run was sent out to 30 members of SME to confirm the suitability of all 38 questions being asked in term of clear understanding and estimated time taken to complete answering the questions.

According to Loehlin [10], it would be more advisable to collect a sample size of at least between 100-200 respondents for an acceptable quantitative statistical analysis. Accordingly, 281 usable responses were obtained for this exploratory study. Reliability of data was well measured above a threshold value of 0.7. And after considering the item discrimination for correlation > 0.3, Cronbach’s Alpha attained were 0.88 and 0.76 respectively for green management factor (GM) and green performance factor (GP).

To determine the model fit, data analysis was performed using the structural equation model (SEM). SEM allows testing of the hypothesized model from the priori and correlational of the latent constructs.
3. RESULTS AND DISCUSSION

3.1 The measurement model

Figure 1 shows the path analysis result between GM and GP as performed by the SPSS-AMOS. The hypothesis asserted that GM was measured by Competitive Resources (f1) and Process Realization (f2) constructs. Likewise, Environmental Control (f3) and Social-Economic Success (f4) have formed the constructs for GP. Based on the outputs, all the four factor loadings were found greater than 0.5 which were statistically significance at p < 0.5 as exhibited in Table 1.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Regression Weight</th>
<th>Significance (&gt;0.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM → GP</td>
<td>0.99</td>
<td>Yes</td>
</tr>
<tr>
<td>GM → f1</td>
<td>0.85</td>
<td>Yes</td>
</tr>
<tr>
<td>GM → f2</td>
<td>0.80</td>
<td>Yes</td>
</tr>
<tr>
<td>GP → f3</td>
<td>0.72</td>
<td>Yes</td>
</tr>
<tr>
<td>GP → f4</td>
<td>0.91</td>
<td>Yes</td>
</tr>
</tbody>
</table>

All the 14 items tested have produced significance factor loadings ranged from 0.42 to 0.88. These variables comprised of:

a) f1: sf3 (responsiveness), ru1 (exploitation), ru2 (economic values) and ru4 (harmless).
b) f2: sf2 (objectives), sf4 (competitive) and km5 (problem solving).
c) f3: en1 (natural resources), en3 (recycle) and so1 (safety).
d) f4: ec1 (sales), ec2 (ROI), ec3 (R&D), en6 schedule waste and so3 (awareness).

3.2 Goodness of fit statistics

The following Table 2 summarized the path analysis of relationship between the GM and the GP.

<table>
<thead>
<tr>
<th>Goodness of Fit Indices</th>
<th>Result</th>
<th>Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X²</td>
<td>89.114</td>
<td>p &gt; 0.05</td>
<td>Yes</td>
</tr>
<tr>
<td>GFI</td>
<td>0.954</td>
<td>&gt; 0.90</td>
<td>Yes</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.034</td>
<td>&lt; 0.30</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFI</td>
<td>0.977</td>
<td>&gt; 0.95</td>
<td>Yes</td>
</tr>
<tr>
<td>NFI</td>
<td>0.913</td>
<td>&gt; 0.90</td>
<td>Yes</td>
</tr>
<tr>
<td>Parsimonious:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNFI</td>
<td>0.970</td>
<td>&gt; 0.50</td>
<td>Yes</td>
</tr>
<tr>
<td>PCFI</td>
<td>0.730</td>
<td>&gt; 0.50</td>
<td>Yes</td>
</tr>
</tbody>
</table>

All the goodness of fit indices exhibited in the table have been successfully achieved. The measure of absolute fit indices indicated that the correlation or covariance of the hypothesized model fits the correlation or covariance of the actual observed data. On the other hand, the relative fit indices measured well on the independent model and ascertain no relationship within the data as the model became saturated. Finally, the parsimonious fit indices suggested that even if the path becomes larger, it was still likely that the model would be accepted.

4. CONCLUSION

The main purpose of green management is to enhance companies’ compliance toward the green principles. The result shows a significant influence by the four factors as determined above in order to transform SME into green companies. However, the performance of a green company could be further enhanced if the internal resources have better awareness and more prepared with the right skills and capabilities.

As the study focused on the implementation of the green process in manufacturing, one factor that might be important but intentionally not included was the financial aspect. In addition, with regard to the limited resources owned by the SMEs in Malaysia, samples from different industries could be useful to make comparison of the best outcome of such research in the future.

5. ACKNOWLEDGEMENT

This article is a partial requirement of the Principal Author post-graduate study. The Principal Author would like to thank the Faculty of Management, Universiti Teknologi Malaysia (UTM); in particular, Dr. Aslan Amat Senin, for the assistance given throughout his studies at the university. He also feels very grateful to the
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REFERENCES

Prediction of students’ performance in elective subject using data mining techniques

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Keywords: Data mining; decision tree; K-Means

ABSTRACT – Polytechnics’ students must take the elective subjects to complete their study. The result obtained in the final examination will affect their future. It becomes essential to predict whether the students will pass or fail in the final examination. In this paper, data mining is used to predict the students’ performance in elective subject. It involves the final year students data who take FP531 as elective subject. Decision tree and K-Means are applied as a method for data mining techniques. The research findings showed that students whose result weak in both SPM Mathematics and BA102 are predicted as fail in FP531.

1. INTRODUCTION

In polytechnics, to complete the diploma level, each student has to take the elective subjects. The elective subjects offered depending on the structure of the programs. An elective subject is an optional subject that the student has to take in order to complete their study. Normally, the elective subject is not a core subject. All students can choose it. While required subject which sometimes called core subjects are deemed essential for an academic degree, elective subjects tend to be more specialized. Elective subject usually has fewer students than the required courses. Some students choose the incorrect subject and in consequence received unsatisfactory result in final examination or not finish their study.

Therefore, by realizing the important of choosing the correct elective subject, this research will highlight that the elective subject is important as the core subjects in having a good result. Based on the observation, students who choose the correct subject are getting a good result. In choosing the elective subjects, the students should select the subject that suitable with them and their interests. The students who take a right subject based on their interest and knowledge normally easy to understand the lecture compare to the students who are not interested. Based on the findings, a further research to find the best solution to solve this problem is addressed.

According to previous researcher, they used the data mining techniques in supervised and unsupervised assessment data of student performance [1]. They used the association rules algorithm in enhancing the quality and experiences of students’ performance in higher of higher education for the improvement and revision of assessment methodologies, restructuring the curriculum, and trimming down the mismatch between the two modes of assessments. Previous researcher had also used the association rules algorithm techniques to identify students’ failures pattern [2]. The educator can use the pattern from the analyze result in making the decision to enhance the learning process. It also helps to build the curriculum structure in order to improve students’ academic performance and trim down failure rate. In the student-centered educational system, Knowledge Discovery in database (KDD) is very useful[3]. It concerns with developing new methods to discover knowledge from educational database in order to analyze student’s trends and behaviors towards education.

2. METHODOLOGY

2.1 Research methodology

This section elaborates the process of predicting the students’ performance. During of data gathering, the literature survey (LS) was used to obtain information about students’ profiles and current approaches in predicting the students’ performance using data mining. For this study, student profile was taken from IPUO systems. As a range of research, ICT students profile from year 2011 to 2013 was taken and it’s involved final year students . The selected semesters are June 2011, December 2011, June 2012, December 2012, June 2013 and December 2013. Each session would take the students from final year that had fifty plus number of students who took FP531. Evidently, not all of the students would complete their study till the end of semester. With that facts, the researcher had to make sure the number of student must be same. From the final result spreadsheet only FP531 marks will be selected to be processed. During the phase of Preprocessing Dataaall of the collected data would be copied into Ms. Excel file. As part of data preparation and preprocessing of the data set and to get better input data for data mining technique, its needs to do some preprocessing for the collected data before it can load into the data mining software.
2.2 Population of the research

In this paper, the focus area was department of Information Communication Technology (ICT). The sample consisted of 592 final year students. This study was focusing on FP531 course as elective subject because in this course it had final examination.

2.3 Research tools

For preprocessing phase, the selected student data was cleaned and transformed before mining process using RapidMiner Software.

2.4 Analyze data

For this study, Decision tree method was chosen to predict the student performance based on the selected elective subject. BA102 final result and Math SPM final result are the two factors that were considered in this study. The second technique was clustering. Clustering is unsupervised learning method. It is a great first step to use when looking at a large data set [4]. K-Means algorithm is chosen for this technique which is the simplest clustering method. Four cluster; cluster_0, cluster_1, cluster_2 and cluster_3. Each cluster has the number of items.

Table 1 presents the strong rules that had been generated from the mining process which gained all of valuable results. All of the rules could be classified to predict the students’ final result of elective subject (FP531). This prediction was based on their SPM Math and BA102 result. For example, the student who had very good in SPM Math and BA102 result was predicted as excellent in her elective subject (FP531). For those who weak in SPM Math and BA102 result, they were predicted as fail in final result for elective subject (FP531).

Table 1 Prediction rule Model.

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>GENDER</th>
<th>SPM MATH</th>
<th>BA102</th>
<th>FINAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>GOOD</td>
<td>GOOD</td>
<td>EXCELLENT</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>GOOD</td>
<td>FAIR</td>
<td>HONORS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>FAIR</td>
<td>WEAK</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>FAIR</td>
<td>GOOD</td>
<td>FAIL</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>FAIR</td>
<td>GOOD</td>
<td>HONORS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>GOOD</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>FAIR</td>
<td>FAIL</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>FAIR</td>
<td>HONORS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>GOOD</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>GOOD</td>
<td>FAIL</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>FAIR</td>
<td>HONORS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>FAIR</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>MALE</td>
<td>WEAK</td>
<td>FAIR</td>
<td>PASS</td>
</tr>
</tbody>
</table>

2.5 Implementation

The experiment used two methods. The two methods were classification and clustering. In classification, the decision tree algorithm would be used where as in clustering; K-means algorithm would be applied.

3. RESULTS AND DISCUSSION

The experiments are conducted using RapidMiner software. To validate the result, it split into two sets of data which the larger data set for training and smaller data set for testing. The accuracy for both data sets is not a big difference. For the training data set, the mean accuracy is 76.19% whereas for testing is 77.5%. Regarding to the experiment result, there is a small number of students whose result did not predict correctly. The miss accurate values are also measured. There are four items which are missed accurate value; 2 increased grade, 1 increased grade, 2 decreased grade and 1 decreased grade. The prediction final result is based on the two factors which are BA102 final result and SPM Mathematics result. The research findings show that the two factors influence the prediction result. Students whose result are very good in BA102 and SPM Mathematics will score excellent in the final result for FP531 whereas who is weak result in both will fail in the final. Otherwise, students whose result did not good enough can choose another elective subject. Therefore, the students who want to select FP531 as their elective subject must be good enough in BA102 and SPM Mathematics in order to score in the final for FP531.

Table 2 Combination all of experiments result.

<table>
<thead>
<tr>
<th>NO</th>
<th>EXPERIMENT DATA</th>
<th>NUMBER OF STUDENTS</th>
<th>ACCURACY</th>
<th>PERCENTAGE THE STUDENTS WHOSE RESULT PREDICT NOT CORRECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INCREASEGRADE</td>
</tr>
<tr>
<td>1</td>
<td>JUNE 2014</td>
<td>92</td>
<td>77.5%</td>
<td>0.00%</td>
</tr>
<tr>
<td>2</td>
<td>DECEMBER 2013</td>
<td>128</td>
<td>59.58%</td>
<td>3.14%</td>
</tr>
<tr>
<td>3</td>
<td>JUNE 2013</td>
<td>95</td>
<td>77.55%</td>
<td>0.00%</td>
</tr>
<tr>
<td>4</td>
<td>DECEMBER 2012</td>
<td>171</td>
<td>69.24%</td>
<td>0.00%</td>
</tr>
<tr>
<td>5</td>
<td>JUNE 2012</td>
<td>12</td>
<td>76.19%</td>
<td>0.00%</td>
</tr>
<tr>
<td>6</td>
<td>DECEMBER 2012</td>
<td>61</td>
<td>67.12%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Table 3 Summarizing result for training data and testing data.

<table>
<thead>
<tr>
<th>STUDENTS WHOSE RESULT PREDICTED CORRECT</th>
<th>PERCENTAGE (%)</th>
<th>STUDENTS WHOSE RESULT PREDICTED NOT CORRECT</th>
<th>PERCENTAGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TESTING DATA</td>
<td>93</td>
<td>77.5</td>
<td>27</td>
</tr>
<tr>
<td>TRAINING DATA</td>
<td>421</td>
<td>71.11</td>
<td>171</td>
</tr>
</tbody>
</table>

4. SUMMARY

The proposed model on data mining technique is proved can mine the students’ record. Therefore, the FP531 final result can be predicted. Both of data mining techniques used in this study are helpful on mining the students’ data. By referring to the experiments, it shows that the highest accuracy is 77.55% for semester June 2013. Semester December 2013 has the lowest accuracy which is 59.38%. It is not a good result. From the observation, for December 2013, it involves 128 students. Many students are from community college and polytechnic certificate students. Therefore, their SPM result and BA102 final result did not good enough.
But may be their effort in the class and before the final exam helped them to achieve better result during the exam. The inaccurate prediction results due to some factors as the students’ effort, their awareness, and the others.

REFERENCES


Wearable technology in education: Towards hands-free learning

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Keywords: Wearable technology; google glass; hands-free devices

ABSTRACT – The introduction of wearable technology brings new intervention in the learning community especially in supporting teaching and learning process. With the proven advantages offers by wearable technology, the learning scenarios are now more effective, efficient and engaging. This paper analyzes the lecturers’ perception towards the used of wearable technology in supporting teaching and learning process specifically for technical courses.

1. INTRODUCTION

The influence of technology revolution continues to expend especially in the education fields. Starting from the introduction of Arpanet in the early 1969s, up to the current wide dissemination of smart phones in the early 2007s aiming for supporting teaching and learning process. The latest significant discussion in mobile or handheld education is the used of wearable technology in education. Example of wearable technologies such as bracelets, clothing, watches, and glasses, where most of the application are in the fields of medical centers, libraries and universities.

One of the most popular wearable technologies (after this will be address as WT) are smart glasses. Smart glasses are wearable computing devices in the form of computerized eyeglasses that function to add information into reality or actually helps people to see better [1]. Smart glasses collect information from internal or external sensors, retrieve data from other instruments or computers and support wireless technologies like Bluetooth, Wi-Fi, and GPS [2]. Figure 1 illustrate an example of smart glass, which is Google Glass hardware breakdown which being used for this study.

Researchers believed that smart glasses have enormous potential implication and benefits for augmentation of teaching and learning environments. Some of the potential benefits offers by smart glasses are: (a) able to engage, stimulate, and motivate students to explore class materials from different angles; (b) able to teach subjects where students could not feasibly gain real-world first-hand experience; (c) enhance collaboration between students and instructors; (d) foster student creativity and imagination; help students take control of their learning at their own pace and on their own path; and (e) able to create an authentic learning environment suitable to various learning styles [3]. Figure 1 illustrate a general overview of model for applying WT in education [4].

Therefore, the purpose of this study is to identify the lecturers’ perception on the use of WT in supporting teaching and learning process specifically for technical courses.

2. METHODOLOGY

This study implemented qualitative based method. Several semi-structured interview sessions were conducted to elicit the lecturers’ feedback on their perception on the use of WT in supporting teaching and learning process. During the interview sessions, the questions were asked including: the use of WT to improve students’ understanding, to improve learning effectiveness, to increase students’ engagement with the subject, and their comfortableness to use WT for teaching and learning.

In particular, at the early stage of the interview, we explained the main objective of the study and introduced roughly what is WT and example of it. In addition, we also demonstrate few functionalities of Google Glass and giving them an opportunity to try and experience the use Google Glass. By doing this will allow the lecturers to have a clearer picture on how the Google Glass can be use in supporting teaching and learning process specifically for technical courses.
learning process. The duration for each interview session is around 30 to 45 minutes. The respondents’ feedback was collected by note taking and few interview sessions by voice recording. The collected data were analyzed using theme-based content analysis, as per suggested by [5] in analyzing qualitative based method.

3. RESULTS AND DISCUSSION

There is a total of 17 lecturers from different faculties in UTeM participate in this study with 10 of them are female and remaining 7 are male lecturers. Figure 2 outlined the respondents’ distribution by faculties.

![Figure 2 Respondents’ distribution by faculties.]

Findings from the participants’ feedback can be categorized into 4 major themes: a) engagement tool, b) promote effectiveness and efficiency, c) first-person view, and d) recording ability. Table 1 summarized the data findings.

<table>
<thead>
<tr>
<th>WT theme</th>
<th>Participant feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement tool</td>
<td>Several respondents (n=6) felt that WT impact the quality of learning through increase students’ engagement especially in learning technical subject. “Technical students learn fast through visualization. Google glass will help them to engage more with the learning.” (Lecturer A, FTMK). Some respondents (n=9) identified that the use of WT can promote effective and efficient in learning technical subject. “The used of wearable technology for purely practical-based courses is very suitable because it has very clear result that the students must achieve for particular exercise; and using the tool it can help to increase students understanding on particular exercise.” (Lecturer C, FKE).</td>
</tr>
<tr>
<td>Promote effectiveness and efficiency</td>
<td>WT afford the ability to offer a first-person point of view (n=11). “Students can watch lab exercises videos from the lecturer’s point-of view. This can help the students to “do things right” at the first time.” (Lecturer F, FTK).</td>
</tr>
<tr>
<td>First-person view</td>
<td></td>
</tr>
</tbody>
</table>

Recording ability WT able to make the lectures and hands-on activities be handy for recording. Recording of important information allows the students to understand the gist of the learning. All respondents do unanimously agree on this (n=17). “I can record videos not only for lecture purpose, but also can be use out in the industrial fields.” (Lecturer D, FKEKK) “Its hands-free ability allows lecturer to use both hand while conducting practical demonstration and on the same time its allow hands-free documentation.” (Lecturer J, FTK) “It is hard to find good theoretical-based explanation in the internet. Smart glass able to help me personalize my explanation especially on theoretical-based topic by record and share the videos, and the students able to play the videos several times at anytime and anywhere.” (Lecturer N, FKM).

4. CONCLUSION

Summary from data analysis reflected that WT able to support engagement, promote effectiveness and efficiency, foster first-person view, and offers recording ability. This reflect that the use of WT especially in learning technical subject is feasible and effective.

ACKNOWLEDGEMENT

The authors would like to take this opportunity to highly appreciate the cooperation given by the lecturers and the opportunity given by UTeM CRIM and UTeM Zamalah for funding this research.

REFERENCES

Gender and faculty relation to VAK learning style preferences among technical students
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Keywords: VAK learning style; technical students

ABSTRACT – The ability to understand student learning styles can increase the effectiveness of two ways communication in transferring knowledge between students and lecturers. It also will develop students to be effective problem solver, and aiding them to increase their focus on an attentive learner. Students utilize all of their senses to process information, however they seem to have preferences to optimize learning ability and produce their best outcome. The purpose of this study is to identify technical students’ preferred learning styles and to examine the relation between students’ learning styles with gender and faculty. A sample of 278 technical students from one university in Melaka was selected in this study. A stratified random sampling was used to select the sample of this study and the VAK questionnaire was used as research instrument. The data were analyzed using descriptive and chi square test. The findings reveal that kinesthetic learning style was the most dominant learning style among university technical students. Gender does significance related to students’ learning style, meanwhile faculty does not significance related to students’ learning style.

1. INTRODUCTION

Learning style is defined as the conditions under which learners perceive, process, store and recall what they are attempting to learn most efficiently and effectively [1]. One of the learning style characteristics that shape a students’ learning style is based on the sensory modality [2]. The three sensory modalities are defined as visual (V), aural (A), and kinesthetic (K) or also known as VAK.

Students with a visual (V) learn by seeing or observing as best preference, while students with auditory (A) preference listening to or recording lectures, discussing materials or talking through material with themselves or others. Kinesthetic (K) style learners perform best by using physical experiences such as performing an activity, moving, doing and manipulations of objects [3-5].

Understanding students’ learning style allows lecturers to understand why students receive and process information the way that they do [6]. Through the information, lecturers are able to be flexible and calibrate their teaching methods with students so that rapport and connections with different types of students are better and improved [7]. When information conveys to someone who are using the same representation, the conversation flows easily but it can be awkward when communicate to someone with a different one [8]. A lecturer could have students with different learning style, thus it is important to understand and match the representation of the students they are communicating with to achieve most effective lecture [9]. The objectives of this paper are to identify learning style among technical students from one of the technical university in Malaysia, thus to examine the relation of students learning style with gender and faculty.

2. METHODOLOGY

A total of 278 technical university students across faculties were involved in the study. The samples were selected by stratified random sampling technique. The respondents were to answer the survey questionnaire developed by [10]. It is composed of two parts; demographic background and the VAK learning style questionnaire which contains 30 multiple choice questions. The data were analyze using descriptive statistics and chi square test.

3. RESULTS AND DISCUSSION

From the total of 278 sample, 45.7 % were male students and 54.3% were female students. Majority of the respondents were Malays students (91.4%), followed by Chinese (7.5%), and Indian (1.1%).

The proportion of entrance to the university were almost the same, i.e. 39.2% entrance were upon completed their matriculation course, 37.1% entrance were based on their diploma qualification and 23.7% were enter the university based on their Sijil Tinggi Pelajaran Malaysia (STPM) result. At present the respondents were studying in diploma level (29.9%) and degree level (70.1%).

Table 1 shows a descriptive frequency and percentage of students’ learning styles. Overall, majority of technical students who involved in the study are kinesthetic learners, which contribute to 44.6% out of total
respondents, followed by Visual (34.2%) and Auditory (21.2%).

Table 1 Students learning styles preferences

<table>
<thead>
<tr>
<th>Learning Style</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory</td>
<td>59</td>
<td>21.2</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>124</td>
<td>44.6</td>
</tr>
<tr>
<td>Visual</td>
<td>95</td>
<td>34.2</td>
</tr>
</tbody>
</table>

Further analysis using chi square test were performed to examine the relation between students learning style with gender and faculty. Table 2 shows observed and expected frequency of students learning styles based on gender, and Table 3 shows a chi square test output on relation between students learning style and gender.

Table 2 Cross tabulation table of students learning style preferences and gender

<table>
<thead>
<tr>
<th>LEARNING STYLE</th>
<th>A</th>
<th>K</th>
<th>V</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>32</td>
<td>54</td>
<td>65</td>
<td>151</td>
</tr>
<tr>
<td>Expected</td>
<td>32.0</td>
<td>67.4</td>
<td>51.6</td>
<td>151.0</td>
</tr>
<tr>
<td>Count</td>
<td>27</td>
<td>70</td>
<td>30</td>
<td>127</td>
</tr>
<tr>
<td>Male</td>
<td>27.0</td>
<td>56.6</td>
<td>43.4</td>
<td>127.0</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>124</td>
<td>95</td>
<td>278</td>
</tr>
<tr>
<td>Expected</td>
<td>59.0</td>
<td>124.0</td>
<td>95.0</td>
<td>278.0</td>
</tr>
</tbody>
</table>

Table 3 Chi square test of students learning style preferences and gender

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>13.411(a)</td>
<td>.001</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>13.624</td>
<td>.001</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>278</td>
<td></td>
</tr>
</tbody>
</table>

Further analysis using chi square test were performed to examine the relation between students learning style with gender and faculty. Table 2 shows observed and expected frequency of students learning styles based on gender, and Table 3 shows a chi square test output on relation between students learning style and gender.

Table 4 Chi square test of students learning style preferences and faculty

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.217(a)</td>
<td>.875</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1.228</td>
<td>.873</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>278</td>
<td></td>
</tr>
</tbody>
</table>

Further analysis using chi square test were performed to examine the relation between students learning style with gender and faculty. Table 2 shows observed and expected frequency of students learning styles based on gender, and Table 3 shows a chi square test output on relation between students learning style and gender.

Table 4 Chi square test of students learning style preferences and faculty

4. CONCLUSIONS

In conclusion, students in the technical university have different types of learning style. Kinesthetic learning style was found to be more prevalent than visual and auditory learners. The students’ learning types did not relate significantly to which faculty they attached to. However, the students’ learning style did relate significantly to students’ gender. Higher percentage of male students in the technical university are kinesthetic learners. Meanwhile, greater number of female students are visual learners. Based on this finding, lecturers are suggesting to be creativity, apply and adapt teaching methods and techniques to match varies students’ learning style. The suggestions will allow the knowledge and information to be transfer effectively to the students. In addition, teaching and learning through technology also need to be examined carefully, so that the information deliver match to different type of students’ learning style.

REFERENCES

Developing a framework of visual spatial relationship games for autistic learners
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²) Innovative and Sustainable Technical Education Group, Centre of Technopreneurship Development, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia.

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ABSTRACT – The objective of this paper is to report the developmental framework of visual spatial relationship for autistic learners. The serious games technique has been used as a tool for special education teachers to diagnose visual spatial relationship problems in autistic students. This development framework will be used as reference for developing a diagnostic tool that could assist and help teachers to diagnose their autism students without the teachers needing to have some experience and knowledge of diagnosing visual spatial relationship. This framework will be a high-tech solution to diagnosing visual spatial relationship problems designed for autistic children.

1. INTRODUCTION

According to Wan [1] autism is undetected from birth and supported by Kanner [2] that the only when the child is around 18 months of age a brain disorder could be detected. Autism means a condition that causes children to concentrate on their own world. Autism interferes with mental development of children incorporating speech, emotions, communication, thinking, social interaction, behavior, impairment and also unusual behavior.

Although there are several regular factors shown in most people with autism, Autism Spectrum Disorder (ASD) is a distributive developmental disorder within individuals in numerous degrees of impairment [3]. For example, although these autistic people look well, his gross motor control is lacking, by and large, he loves to interact with technology and video games and become attached to a particular interest like dinosaurs, trains, or outer space.

In relation to that, intensive research and study has been done on serious game based for learner with autism in the field of computing. Visual perception problem is very common in autistic learners. They experienced learning difficulty particularly in recognizing, remembering, organizing and interpreting objects especially visual images. As a result, they are easily confused in situations that involve using written or pictorial symbols for learning [4].

In this paper, the aims are described as (a) to review current serious games for autism and (b) to propose a new development framework.

This paper has been divided into four parts. The first section deals with introduction, section two describes the related works of serious games for autism and section three presents the proposed development framework model. Finally, section four concludes the paper and suggests future work for research.

2. RELATED WORKS

Therapy and education [5], which include learning and training are the two main purposes for autism serious games development as tabulated in Table 1 and Table 2 below. Autism serious games for therapy have been done with the main purpose therapy for social skill, communication skill, sensory integration, visual motor coordination, concentration and social behaviors. Teaching and learning process by using serious games for education will help special educators and students with learning difficulty.

Table 1 Serious games for therapy of autistic children.

<table>
<thead>
<tr>
<th>No.</th>
<th>Purpose/ Objectives</th>
<th>Ref</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Interaction skills measurement</td>
<td>[6]</td>
<td>2013</td>
</tr>
</tbody>
</table>

Table 2 Serious games for education of autistic children.

<table>
<thead>
<tr>
<th>No.</th>
<th>Purpose/ Objective</th>
<th>Ref</th>
<th>Year</th>
</tr>
</thead>
</table>

3. FRAMEWORK DEVELOPMENT

The developmental framework was developed as depicts in Figure 1. This diagram shows the overall developmental framework model that served as a guide to engage all the referred diagnosis method. This was adapted to the development of the prototype design and research question solutions based on the visual spatial relationship.
relationship game development phase.

The game developed known as VSR-Game which stand for Visual Spatial Relationship Game. In terms of development methodology, the prototype VSR-Game was developed based on the well-known multimedia development model namely ADDIE model. ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation. ADDIE consists of five-phase systematic model used to guide through the process of creating multimedia products for a variety of settings. Each phase of the ADDIE model is an important element of the design process. In each phase, decisions are made for ensuring the effectiveness of the game experience. Special education expert from Malaysia Ministry of Education been referred for the game content development.

![Diagram of ADDIE model](image)

Figure 1 Developmental framework.

4. CONCLUSION AND FUTURE WORK

In this paper, a related work of current serious games for autism; a development framework model to diagnose visual spatial relationship problem for autism children were discussed.

The prototype VSR-Game was developed based on the ADDIE model which consist of Analysis, Design, Development, Implementation, and Evaluation. In the analysis phase, the visual perception diagnostic test requirements for children with autism were analyzed. In addition, the problems that directly influenced the motives of the research were identified. The second phase is the design phase that involved identifying software requirements specification for the VSR-Games. The third phase is the development phase focused on building the outcome of the design phase which integrated artwork, visual perception test and game design. The fourth phase is implementation phase. The media integration is ensured the efficiency of the game application. During implementation, numerous activities were included to come out with the expected output. All the modules and elements were incorporated to produce the final ready-to-use product. The last phase is evaluation. During the evaluation process, feedback was collected from subject matter experts and content experts. By and large, the evaluation process is required to find out how well a system works. The implementation phase marks the completion of the product’s development. In this study, ADDIE model is an important element of the design process. In each phase, decisions are made for ensuring the effectiveness of the VSR-Game experience and the result of diagnosing Visual Spatial Relationship for autistic learners.

Serious game is relevant to help several problems such as autism. Serious games are a specific purpose games which could be uses as a tools to detect autistic level. Insomuch that, digital games can be assessed regularly by integrating other forms of conventional assessment with modern procedures. Additionally, this situation offers the opportunities to create assessment that is more intricate and complete. Future study should focus on the visual perception diagnosis assessment by using serious game technique to identify visual spatial relationship problems among autism children.

REFERENCES


Investigating graduate global employability competency framework towards sustainable human capital development
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Keywords: Employability; competency; framework

ABSTRACT – Lack of experience and global exposure are among the demand of global employers. The objective of this study was to investigate graduate global employability competency framework towards sustainable human capital development. This study utilized a quantitative approach through questionnaires adopted from Engineering Accreditation Council (EAC) and Career Adopt Ability Scale (CAAS) scale consist of 23 item. Findings are expected to add value to the development of employability framework.

1. INTRODUCTION
Developing human capital for future workplace are very challenging especially when the necessity of employees to possess abilities, motivation and be given opportunity to perform are given priority [1]. Local employers demand soft skills competency among prospective graduate [2]. The global employability competency needs are extended to global context such as global knowledge, global collaboration and team work in diversity cultural team, adaptability and flexibility [3]. Without the competency needed, this will lower the organizational performance and associations. Thus, there is a need to develop employability competency framework towards sustainable human capital. The objective of this study was to investigate graduate global employability competency framework towards sustainable human capital development.

2. METHODOLOGY
This study utilized a quantitative method. A survey was conducted among 292 the final year engineering students identified through stratified random sampling method from local technical university.

The questionnaires were adopted from Engineering Accreditation Council (EAC) [4] consist of 10 item scale of engineering employability skill and CAAS [5]. The instrument was divided into 2 sections; Section 1 consisted of employability skills and section 2; consisted of 4 subscales of CAAS which were concern, control, curiosity and confidence. Overall, 33 items were validated. Respondents responded to Likert items in the questions with scale range from 1 (not important) to 5 (very important). Results were analyzed through descriptive statistical analysis.

3. RESULTS AND DISCUSSION
The Table 1, Cronbach alpha value of this instrument was .965. High alpha value indicates a high consistency between items in the set, and vice versa. Cronbach’s alpha for section 1 part a (personal skills) was .914 as shown in Table 2. This demonstrates an excellent reliability.

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.965</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 2 demonstrate Cronbach’s alpha for section 1; part b (Knowledge) was .834. This part shows good level of reliability. Thus, section 1 employability has shown a very high consistency between items. Hence, greater the relative number of positive relationships, and stronger inter correlations among the items. Cronbach’s alpha for section 2 part a (Concern) was .871. Cronbach’s alpha for section 2; part b (Control) was .863, Cronbach’s Alpha for section 2; part c (Curiosity) was .885 and Cronbach’s alpha for section 2 section d (Confidence) was .886 as a whole. The data reduction analysis result shows the KMO adequacy of the correlation matrix is .951. From Table 3, Bartlett’s test of sphericity tests the adequacy of the correlation matrix and yielded a value of 6729.171 and an associated level of significance smaller than 0.001. This procedure determines whether the data deviates significantly from a random matrix. Thus, the correlation matrix has significant correlation amongst at least some of the variables.
The result of factor analysis output in Table 4 shows the Total Variance Explained using the criterion of retaining only factors with eigenvalues of 1, five factors were retained for rotation. These five factors accounted for 47.968%, 5.684%, 4.725%, 3.243% and 3.134% of the Total Variance, respectively and for a total of 64.754%. According to Field [6], “reasonable comprehensiveness” is maintained when extracted factors explained at least 60% of variance. The factors are reflected on the important for success in the workplace; factor 1- personal skills, factor 2-concern, factor 3- control, factor 4-curiosity and factor 5-confidence.

The descriptive statistics in Table 5, demonstrate that the highest score in employability section was personal skills followed by knowledge whereas the high scores in Section 2 were confidence, curiosity, concern and lastly is control, respectively. The result also indicates clearly that personal skills and confidence both have similar score. Matching the personal skills at entry level for employment will also boost the prospective graduates” confidence and self-esteem in the workplace [7]. The low scores were “keeping upbeat”, “making decision by myself”, “taking responsibilities”, “sticking up for my beliefs”, “counting on myself and doing what is right”. Hence, the prospective graduates have problems and issues in taking self-responsibility. The main point for persistence in the workplace is resolute by the features of an engineering student captivating responsibilities to fulfill the industry’s needs over the involvement in career-enhancing activities. Lacking of self-responsibility from the prospective graduates in the skill development activity, the process only generates reconstruction of skills [8]. Thus, this demonstrate incompetent quality graduates who is lack of skills, ill-trained and fruitless and become obstacle for prospective graduates to be employable.

4. CONCLUSION

The result has indicated high score in personal skill in section 1 and confidence in section 2. The finding was conforming the Pool & Sewell’s CareerEDGE model [7]. It demonstrates the critical elements when developing employability model both personal and confidence elements must be included as the framework component. The finding also certain that the prospective graduate required sustainable skills in their learning for career sustainability.

ACKNOWLEDGEMENT

The research team wishes to thank the Ministry of Higher Education (MOHE) for funding the study under Research Acculturation Collaborative Effort Grant Scheme (RACE)RACE/F3/SS1/PBPI/F00254 and University Technical Malaysia Melaka for supporting the study.

REFERENCES


Table 3 KMO and Bartlett’s test.

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin measure of sampling adequacy</th>
<th>Bartlett's Test of sphericity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. Chi-Square</td>
<td>6729.171</td>
</tr>
<tr>
<td>df</td>
<td>528</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 4 Total variance explained.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>% Variance</th>
<th>% Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15.829</td>
<td>47.968</td>
<td>47.968</td>
</tr>
<tr>
<td>2</td>
<td>1.876</td>
<td>5.684</td>
<td>53.651</td>
</tr>
<tr>
<td>3</td>
<td>1.559</td>
<td>4.725</td>
<td>58.377</td>
</tr>
<tr>
<td>4</td>
<td>1.070</td>
<td>3.243</td>
<td>61.620</td>
</tr>
<tr>
<td>5</td>
<td>1.034</td>
<td>3.134</td>
<td>64.754</td>
</tr>
</tbody>
</table>

Table 5 Descriptive statistic.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employability</td>
<td></td>
<td>4.5068</td>
<td>0.55083</td>
</tr>
<tr>
<td>(personal skills)</td>
<td>292</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employability</td>
<td></td>
<td>4.3813</td>
<td>0.62711</td>
</tr>
<tr>
<td>(knowledge)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAAS (concern)</td>
<td></td>
<td>4.3829</td>
<td>0.59353</td>
</tr>
<tr>
<td>CAAS (control)</td>
<td></td>
<td>4.3076</td>
<td>0.60607</td>
</tr>
<tr>
<td>CAAS (curiosity)</td>
<td>292</td>
<td>4.3990</td>
<td>0.58358</td>
</tr>
<tr>
<td>CAAS (confidence)</td>
<td>292</td>
<td>4.5091</td>
<td>0.52805</td>
</tr>
</tbody>
</table>
Using computer-assisted intervention to improve mathematical learning of students with autism

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Keywords: Concept of addition; autism; computer-assisted intervention

ABSTRACT – There has been numerous research done on the effectiveness of Computer-Assisted Intervention (CAI) in helping students with autism for learning various knowledge and skills. However, most of them are in the areas of literacy and only a small number of them are in numeracy. This research aimed to examine the CAI in helping students with autism to study the concept of addition in maths. Three male students diagnosed with autism and have the prerequisite skills participated in this research. A pre-post-test design was implemented in the research. The discoveries of this research are promising in which all three participants demonstrated a positive outcome at the end of the research.

1. INTRODUCTION

According to BERNAMA’s report as cited in an article published by Time Money [1], it is estimated that one out of every 600 children in Malaysia is born with autism. To ensure that individuals with special needs can live independently, it is vital for them to learn basic skills for independent living, including social skills, communication skills, self-management skills, job skills, daily management and functional academic skills. Additionally, a special curriculum has been designed and used specifically for students with autism due to the limited ability to learn skills and not able to focus on activities that take a long time, although there are also students with autism that have a tendency toward certain skills.

Besides using conventional ways to teach students with autism, numerous researches on the use of CAI to teach them had been done over 35 years [2]. CAI has been used on the children with autism to enhance their social skills [3], communication skill [4] and academic skills [5-6]. In the past, CAI usually utilized as an assistive tool [2] or temporary instructional aid to treat children with autism [7]. However, most researches concentrated on the literacy skills [2,5-6] compared to math skills, which focus on different practices and approaches without the use of CAI. Hence, the goal of this research was to examine the CAI in helping students with autism to study the concept of addition in maths.

2. METHODOLOGY

2.1 Participants

The participants of the research were three male students diagnosed with autism from one of the primary schools in Ayer Keroh, Melaka. The participants were expected to have certain prerequisite skills such as (a) know how to use a computer and mouse, (b) the ability to follow instructions orally or written, (c) the ability to focus on the activity for at least 10 minutes, (d) the ability to recognize numbers between 1 and 10.

2.2 Setting

The research was held in an individualized education classroom. During the experimental session, there was no other person in the classroom other than the researcher and the student.

A laptop was used to present the intervention modules which were developed and presented using CAI during the experimental session. A prompt and assistance were given to the participants if they answered it wrongly.

3. RESULTS AND DISCUSSION

Figure 1 shows that there was an improvement in the performance of participants throughout the experiment. Nevertheless, there were some sessions where the participants’ performance showed slightly decreased, although these performances still within the predetermined performances. The findings of this research are encouraging in which all three participants showed a positive result at the end of the experiment.

3.1 Participant 1

During the pre-test, Participant 1 showed that he already has the basic concept of addition with a score of 60%. Throughout the experiment, Participant 1 seen playful and need help to stay focused at the beginning of the experiment. However, at the third session, Participant 1 began to focus and show an increase in average scores throughout the session. During the experiment, Participant 1 reached target performances after six sessions and the average scores increased to 85%. Participant 1 is said mastered the concept of basic addition skills with guidance and assistance from the
teacher. During the post-test, the scores for Participant 1 increase 30%, from 60% to 90% which propose that the CAI was efficient for him.

Figure 1 Line plot of Participants’ performance during experimental session.

### 3.2 Participant 2

During the pre-test, Participant 2 showed that he already has the basic concept of addition with a score of 50%. However, Participant 2 had missed two sessions but it does not affect his performance on the following session. These were because throughout the experiment, Participant 2 showed a great ability to recall the examples and instructions of the previous session in which help him during the exercise. Participant 2 can be said mastered the concept of basic addition skills. During the post-test, Participant 2 has gained 85%, an increase of 35% compared to the pre-test scores. This proposes that the CAI was efficient for Participant 2.

### 3.3 Participant 3

During the pre-test, Participant 3 showed that he has the minimum basic concept of addition with a score of 30%. Throughout the experiment, Participant 3 showed a great ability to recall the examples and instructions of the previous session which help him during the exercise. During the experiment, Participant 3 reached target performances after three sessions. At the end of the experiment, Participant 3 average scores decreased due to the non-pictorial questions (addition sentence) in which the Participant 3 seems confused and unable to solve the questions. Participant 3 can be said mastered the concept of addition skills with minimal guidance from the teacher. During the post-test, Participant 3 has gained 65%, an increase of 35% compared to the pre-test scores. This proposes that the CAI was efficient for Participant 3.

### 4. CONCLUSIONS

In conclusion, the CAI can play an important role in autism education process and may improve the students’ with autism academic skills as it can represent a controlled environment and makes them feel a certain level of control over the environment [8]. The use of CAI in the long term as learning tools can help to increase the student’s interest towards academic and improving their academic performance. Since most of the students with autism are visual learners [9], the methods used in the CAI such as animations, images and sounds can attract their attention and make them engaged throughout the learning session. Hence, their interest and attention towards the CAI lesson can help to reduce their behaviour problems.

### 5. ACKNOWLEDGEMENT

The authors would like to acknowledge the Centre of Technopreneurship & Development (C-TED) and Innovative & Sustainable Technical Education (ISTE) for their support in the research.

### REFERENCES


Critical success factors for successful software development project
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Keywords: Critical success factor; software development project; IT project management

ABSTRACT – Every successful project is supported by Critical Success Factors (CSF). The purpose of this study is to identify the CSF of successful software development project. The CSFs that used in this study were development team’s technical skill, leadership of project managers, effective team communication, top management support, and user involvement. The target sample in this study was the project team members in Malaysia, Selangor area only. As the result, it showed development team’s technical skills, leadership of project managers, and top management support were significant positive effect with the successful software development project.

1. INTRODUCTION

Information technology tools are widely used in the most of the organizations in the global according to their field requirements. It is unusual to find an organization without information technology tools to execute their daily activities or complete their works as in previous study [1]. A prefect project should be completed in planned duration, but not every project can be completed within the planned timeline. Incomplete a step of software development can lead to the software development failed as in study [2]. According to [3], CSFs are the factors that can support a project become successful. This research is to identify the CSF in Successful Software Development Project.

When a project is produced to specification, within estimated cost, and on schedule with minimum or mutually agreed on the requirement is considered as a successful project [4]. CSF can define as the vital factors that can lead a project become successful as previous study [5]. There are not only with a single factors to support the project become successful, consequently the project managers have to deliberate on the blend of these CSFs and raise the possibility of project success. [6]

Based on the research of [7], there are several factors to affect an IT project success, but it is important to determine the most critical factors. Most of the factors intangible factors, there are the factors built out from the human influences. It implied that, the relationship between people is very important in the software development project, other than the tangible equipment such as computer and machinery.

From the analysed previous research, there are many CSFs that can affect the results of software development project, but in this study only included focus on 5 CSFs as shown in Figure 1.

2. METHODOLOGY

The study was conducted through survey by using structured questionnaire. It consisted of 36 questions with sub questions, organized in two main sections: demographic and CSFs of Successful Software Development Project. In general, 5-Level Likert Scale was used for most of the questions. Data obtained from the survey was analyzed using simple statistical analysis, which are descriptive analysis and multiple regression analysis. The Statistical Package for the Social Sciences SPSS software was used for this purpose.

3. RESULTS AND DISCUSSION

The target respondents had been selected in software development companies which are located at state of Malaysia, Selangor area only. The return questionnaires were only 102 respondents which occupied 34% from the total distributed questionnaire. Table 1 displayed is the result of multiple regression analysis.

If the significant value is greater than 0.05, the independent variable is no significantly to the dependent variable, so the hypothesis is rejected. Whereas, if the significant value is less than or equal to 0.05, the independent variable is significantly to the dependent variable, so the hypothesis is acceptable. There are only three CSF that were significant positive effect with successful software development project in this research. Table 2 showed the summary of acceptance of the hypothesis.
Table 1 Multiple regression analysis.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>0.063</td>
<td>2.347</td>
<td>0.027</td>
<td>0.979</td>
</tr>
<tr>
<td>Development Team's Skills</td>
<td>0.213</td>
<td>0.105</td>
<td>0.164</td>
<td>2.028</td>
</tr>
<tr>
<td>Technical Skill</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership of Project</td>
<td>0.265</td>
<td>0.081</td>
<td>0.317</td>
<td>3.286</td>
</tr>
<tr>
<td>Managers Top Management</td>
<td>0.215</td>
<td>0.094</td>
<td>0.244</td>
<td>2.288</td>
</tr>
<tr>
<td>Support Effective Team</td>
<td>-0.002</td>
<td>0.128</td>
<td>-0.002</td>
<td>-0.015</td>
</tr>
<tr>
<td>Communication User Involvement</td>
<td>0.146</td>
<td>0.079</td>
<td>0.184</td>
<td>1.842</td>
</tr>
</tbody>
</table>

Table 2 Hypothesis.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Accepted</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis 1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There is significant positive effect between Development Team's Technical Skills and Successful Software Development Project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There is significant positive effect between Leadership of Project Managers and Successful Software Development Project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothesis 3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There is significant positive effect between Top Management Support and Successful Software Development Project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothesis 4</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There is significant positive effect between Effective Team Communication and Successful Software Development Project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypothesis 5</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There is significant positive effect between User Involvement and Successful Software Development Project.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. CONCLUSION

The identified CSFs in this study can be the useful information for the project leader and team members to apply on the project hence can improve the rate of successful of the software development project. The current study only identified three CSFs which are development team's technical skill, leadership of project managers and top management support. The leader of the project should observe on each of the CSF and manage well each of the CSF while conduct the project. Besides, the project team members should understand the CSFs of the successful software development project with the project leader and handle well on the CSFs.

Next, this research found that the project team members do not consider effective team communication and user involvement as the CSFs in successful software development project. Whereas, the literature review indicates that the communication is very important in successful software development project. Even in some of the previous research showed that user involvement is the top CSFs in a successful software development project. These two CSFs were not applicable in this research that might cause by different culture of the background for respondents. Most of the previous researches collect data from western and middle east country, hence the working culture are different.

Since the CSFs for the project in different culture might need different of CSFs, the project leader should focus and handle on the CSFs that can give a great impact and lead to successful project. Be a successful leader must have a great capability to handle and manage the team well; therefore, they must achieve the expected results.

From the analysed previous research, those are more CSFs that can affect the results of software development project. Therefore, the future research might extent the numbers of independent variables, hence can test the other CSFs that not included in this research whether applicable for Malaysia Software Development Project.

REFERENCES

Reengineering of supply chain management in manufacturing industries

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Keywords: Supply chain management; competitive advantage and manufacturing industries; supply chain awareness; SCM drivers

ABSTRACT – Reengineering supply chain management (SCM) will ensure manufacturing industries to gain competitive advantage. However, very little attention has been paid for reengineering SCM in manufacturing industries. The objective parameter of this study is to explore the awareness of SCM reengineering and determine the relationship between SCM reengineering and competitive advantage in manufacturing industries. The relationship between reengineering SCM and competitive advantage was tested. The findings of this study both contribute in the academic and pragmatic realms.

1. INTRODUCTION

Supply chain management (SCM) defined as a number of independent manufacturing companies involved in the manufacture of the product and put it in the hands of end users in the supply chain [1]. Present organizations need SCM to compete with other firms. Through effective and efficient SCM, companies can achieve competitive advantage [2]. Companies in various sectors focus on SCM because of tough competitions in the market place [2-3]. Thus, SCM emerged as an important tool for competitive advantage in the market, as it enables the development of relations between the market for customer service excellence at a low cost [4].

Hammer [5] introduced the concept of reengineering as a way to "break away from the rules are outdated and basic assumptions underlying operations". Reengineering has been adopted by many companies in order to improve their competitive position and increase their ability to provide customer satisfaction. [6] discussed the potential improvement in the supply chain of reengineering channel restructure the supply chain so that reengineering can be described as best option.

Many manufacturing companies compete with each other to achieve customer satisfaction in an unsteady competitive market [7]. The understanding and practice of SCM have become a necessary prerequisite for maintain competitiveness and improving profitability in global realms. Apart from that, this study, the researcher may contribute an idea to the management of the manufacturing industries on how to deal with their SCM by using SCM drivers.

2. METHODOLOGY

A multiple regressions analysis was conducted using SPSS version 21. As a way to collect data, researchers used online web-based questionnaire as the primary mechanism for the collection of data using online survey. The online survey was conducted via Google drive. In order to generate measurement items, descriptive research can utilize certain techniques including literature search, empirical study, and insight stimulation. For this study, the questionnaire was outlined after an extensive review of the literature, focusing on generating several details that reveal the core theoretical constructs.

3. RESULTS AND DISCUSSION

The results of correlation analysis indicated that SCM drivers significantly correlated with all variables and all correlations were positively correlated. Table 1 shows the correlation result for SCM drivers and competitive advantage.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
</tr>
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<tbody>
<tr>
<td>Inventory</td>
<td>0.406</td>
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<tr>
<td>Outsourcing</td>
<td>0.417</td>
</tr>
<tr>
<td>Transportation</td>
<td>0.498</td>
</tr>
<tr>
<td>Information technology</td>
<td>0.163</td>
</tr>
<tr>
<td>Facility</td>
<td>0.398</td>
</tr>
<tr>
<td>Pricing</td>
<td>0.475</td>
</tr>
</tbody>
</table>

Multiple regressions were used to predict the value of a variable based on the value of two or more other variables, as shown in Table 2. Multiple regression analysis was utilized to ascertain the typical value of the changes in competitive advantage and drivers of SCM in manufacturing industries.

The relationship between inventory and competitive advantage in manufacturing industries was (ß =0.26, t = 2.55); between outsourcing and competitive advantage was (ß =0.04, t = 0.58); between transportation and competitive advantage was (ß =0.26, t = 2.42); between information technology and competitive advantage was (ß =-0.24, t = -2.74); between facility and competitive advantage was (ß =0.01, t = 0.09); between pricing and competitive

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advantage was ($\beta = -0.30, t = 3.29$) and finally between SCM awareness and competitive advantage was ($\beta = 0.26, t = 3.14$).

### Table 2 Multiple regression.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>t</th>
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</thead>
<tbody>
<tr>
<td>Inventory</td>
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</tr>
<tr>
<td>Outsourcing</td>
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<td>Transportation</td>
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<td>Information</td>
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<td>Pricing</td>
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<td>3.29</td>
</tr>
<tr>
<td>SCM awareness</td>
<td>0.26</td>
<td>3.14</td>
</tr>
</tbody>
</table>

Hypothesis testing (Table 3) is an assertion or a conjecture about a population parameter, such as mean or variance of the normal population. The relationship between inventory and competitive advantage in manufacturing industries was significant (sig .012), outsourcing and competitive advantage was not significant (sig .557), transportation and competitive advantage was significant (sig .017), information technology and competitive advantage was significant (sig .007), facility and competitive advantage was not significant (sig .993), pricing and competitive advantage was significant (sig .001), finally the relationship between SCM awareness and competitive advantage was significant (sig .002).

### Table 3 Hypothesis testing.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Significant</th>
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<tbody>
<tr>
<td>Inventory</td>
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<td>Outsourcing</td>
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<td>Pricing</td>
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<tr>
<td>SCM awareness</td>
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</tbody>
</table>

4. **CONCLUSION**

In conclusion, the study strives to explore the awareness of SCM among manufacturers, determine SCM utilization based on SCM drivers and determine the relationship between SCM drivers and competitive advantage. The relationship between SCM drivers and competitive advantage is tested and the inventory, transportation, information technology, and pricing are strongly related to the competitive advantage in manufacturing industries. This study adds to the literature on SCM. The results have essential implications on SCM in manufacturing industries in acknowledging essential drivers which encompass inventory, outsourcing, transportation, information technology, facility, pricing and SCM awareness in achieving competitive advantage.

**ACKNOWLEDGEMENT**

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**REFERENCES**


Learning style preferences of engineering undergraduates

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Keywords: Learning styles, engineering undergraduates

ABSTRACT – This study focused on the learning style preferences of engineering undergraduates at a technical university. It aimed to examine whether their learning style preferences were influenced by their field of study, gender and ethnic backgrounds. Data was collected from 107 engineering undergraduates using Felder and Solomon’s Index of Learning Styles. The findings suggested that their learning styles preferences did not seem to be influenced by their field of study, gender or ethnic backgrounds. The undergraduates also seem to have a marked preference for the visual learning style while having balanced preferences for the active-reflective, sensing-intuitive and sequential-global learning style dimensions.

1. INTRODUCTION

Educators have their own preferred way of delivering their lessons. Similarly, their students will have their own preferred way of learning. Educators should address the fact that their students are unique particularly in their learning styles preferences. Such diversity means there is bound to be matches and mismatches between the teaching styles of the educators and the learning styles of their students. There are educators who believe that teaching styles should match learning styles [1-2] in order for effective learning to take place. On the other hand, mismatches between teaching styles and learning styles are said to benefit learners by stretching their learning experiences [3] as they are required to use their non-preferred learning styles. This study supports the notion that there should be variety in learning activities for all learning styles to be addressed as a means for enriching students’ learning experiences. Therefore, this study aimed to profile the learning styles preference of engineering undergraduates at Universiti Teknikal Malaysia Melaka. It also sought to determine whether the undergraduates’ learning style preferences were influenced by their field of study, gender and ethnic backgrounds.

2. METHODOLOGY

2.1 Data collection

A total of 107 engineering undergraduates from three faculties took part in this study. They were from the Faculty of Electrical Engineering (FKE), Faculty of Electronics and Computer Engineering (FKEKK) and Faculty of Engineering Technology (FTK). Felder and Solomon’s Index of Learning Styles which was designed with engineering students in mind was distributed to them for the purpose of identifying their preferred learning styles. The validity and reliability of this instrument have been discussed [4].

In Felder’s learning styles model, learners are categorised into eight categories (active, reflective, sensing, intuitive, visual, verbal, sequential and global) [5] which are further categorised into four learning styles dimensions (active-reflective, sensing-intuitive, visual-verbal and sequential-global). Active learners are said to prefer learning by doing and working with others in contrast to reflective learners who prefer to work alone. Sensing learners have preference for facts while intuitive learners have preference for theories. Visual learners learn more from the things they see while verbal learners learn more from written and spoken words. Sequential learners have preference for learning something step by step contrary to global learners who have preference for learning in a holistic way.

2.2 Data analysis

Manual calculation was done based on the calculation provided by Felder before the data was analysed using SPSS. The students’ learning style preferences were categorised according to their field of study, gender and ethnic background. Felder’s model categorises learners according to the four learning styles dimensions. This study considers the fact that students may have balanced preferences for each learning style dimension. For example, students are categorized as having active, balanced and reflective preferences for the active-reflective learning style dimension.

3. RESULTS

As indicated in Table 1, the students were inclined towards balanced preferences for the active-reflective, sensing-intuitive and sequential-global learning styles dimensions. They had a marked preference for the visual learning style.
The data in Table 2, 3 and 4 show that the students had almost similar balanced preferences for the active-reflective, sensing-intuitive and sequential-global learning styles dimensions regardless of their field of study, gender and ethnic backgrounds. They had a marked preference for the visual learning style. Interestingly, none of the FKEKK students had preference for the verbal learning style. The Indian respondents were not included in the analysis (ethnic backgrounds) due to their small number. It is interesting to note that the Chinese respondents are almost equal in their preferences for the visual-verbal learning style dimension by having marked preferences for both the active style and balanced styles.

Table 2 Learning styles preferences of UTeM students: According to field of study (% Count)

<table>
<thead>
<tr>
<th>Fac</th>
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Table 3 Learning styles preferences of UTeM students: According to gender (% Count)

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Table 4 Learning styles preferences of UTeM students: According to ethnic background (% Count)

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4. DISCUSSION

The engineering undergraduates generally have balanced learning style preferences for the active-reflective, sensing-intuitive and sequential-global learning styles dimensions. In contrast, they seemed to have a marked preference for the visual learning style. Similar to a previous study by Zywno and Stewart [6], data analysis also revealed that the students’ learning style preferences did not seem to be influenced by their field of study, gender and ethnic backgrounds.

The findings of the study point towards the possibility of using a balanced teaching approach [7] that includes a variety of teaching and learning activities. Such an approach is believed to be able to improve student learning [8] by maintaining students’ interests and widening student learning experiences as they use their less preferred learning styles [9-11].

5. CONCLUSION

To surmise, data analysis has revealed that the students’ learning style preferences did not seem to be influenced by their field of study, gender or ethnic backgrounds. The students also have a marked preference for the visual learning style while having balanced preferences for the other learning styles dimensions. This study supports the notion that there should be variety in the learning activities in the engineering classroom as a means of enriching the students’ learning experiences.

ACKNOWLEDGEMENT

The author would like to thank Universiti Teknikal Malaysia Melaka for supporting this research.
REFERENCES

The intellectual property challenges for commercialising research products in the Malaysian universities

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Keywords: Intellectual property rights; commercialization; research products

ABSTRACT – Commercialisation of research products in Malaysian universities has now become an important agenda to generate income. While many attempts have been put forward by key-players to promote commercialisation activities, the success rate to date is still less promising. This study examines the challenges in respect to intellectual property rights (IPRs) and commercialisation policy encountered by academic researchers in commercialising their research products. Five academic researchers who have successfully commercialized their research products were selected to be interviewed. This study identified the challenges related to IPRs in commercialising research products in the university.

1. INTRODUCTION

Commercialisation refers to the process of bringing innovation into an improved product that has a potential value to enter into a market. Various platforms are provided by the relevant key-players in supporting commercialisation activities in the university. The efforts are partly considered to recognise university’s contribution in research activity and encouraging them to be as “entrepreneurial university” [1-2]. In Malaysia, commercialisation of research products is quite new and thus the success rate to date is quite limited [3].

Commercialisation activity is closely related to intellectual property rights (IPRs). Intellectual property (IP) exploitation increasingly plays an important role in the global economy [4]. IP related-aspects including the issue of confidentiality of technology, the strength of IP protection and the exclusivity conferred to the rights owner found to be among the significant determinants for a successful licensing and commercialising of university technologies [5].

Recognising the importance of IP in commercialisation, besides the Malaysian National IP Policy introduced in 2007, the Ministry of Science, Technology and Innovation has introduced the IP Commercialisation Policy (IPCP) with the aim to manage and regulate the ownership and management of IPRs carried out by ministries, government agencies and research institutions. The IPCP has paved the way for a more aggressive commercialisation activity in the universities as they have full disposition over their intellectual assets [6]. In fact, Malaysian’s public universities need to provide 25% of their own operating budgets by 2015 [7] thus urge them to act fast in commercialising their research products.

Thus, IP becomes one of the sources of income for the universities and the country. It was reported that patent applications alone among public research institutions has increased 5-fold from 2005 until 2012 [8]. While the number of IP application is increasing, commercialisation remains limited [9]. It was identified that one of the challenges faced by universities concern on IP related issues in term of its identification, creation, protection and exploitation, which will be discussed in the next section below.

2. METHODOLOGY

This study employed a qualitative research using semi-structured interview. Adopting a purposive sampling, five academic researchers were selected based on their technical and scientific background, extensive experience in commercialisation activity, represented their universities and received recognition nationally and internationally. For the purpose of anonymity, the five academic researchers are identified as male interviewees referred as TO, SH, RS, BH and CH.

3. RESULTS AND DISCUSSION

The study identified several IP challenges in commercializing research products in the university. Lack of understanding on the concept of IPRs and commercialisation become the prominent aspects hindering the process. Despite a well-established policy offered by almost all universities in Malaysia, most researchers remain unaware of this aspect and of their rights conferred in the policy. For example, interviewee BH claimed that “when I was a researcher and prior to commercialisation, I did not know much about IP policy, or whatever policy”. Thus, the responsibility in disseminating the knowledge should equally be shared both by the research management centre (RMC) and the researchers.

Difficulty in understanding the legal jargons in such policies among researchers who are mostly from technology and engineering background is also discouraged participation in commercialization activity. Interviewee BH for example admitted that “to be
honest, basically to me or not only to me, I would say [...] it is so difficult to understand because policy was always written by lawyers. The language was not straightforward”. Thus, the assistance from legal experts is important in enhancing the basic knowledge and concept of IP among academic researchers.

This includes the knowledge in identifying the appropriate IPRs to be commercialised. For example, besides patenting, other IPRs that potentially significant to be exploited also include confidential information, copyright, trademarks or industrial design. Academic researchers may opt for different routes of IP protection, thus encouraging them to actively participating in commercialization activity. However, it is worth to note that IPRs protection should not be regarded as the ultimate achievement towards commercialisation because both concepts are different although related. Interviewee SR claimed that “IP is just an IP. But to sell is totally different thing. I think only people that have been commercialised their products can understand that”.

Complex and expensive procedures of IPRs application are also hampering the commercialisation activity. In patent application for example, the university not only has to bear both application fees and cost for the experts to prepare patent’s claims but also has to deal with researchers who did not understand the procedures involved. Interviewee CH shared his view that “not all [researchers] put an effort to understand the flow of IP application until it is granted”. For newly established university, the RMC itself may not sufficiently be equipped with information on this aspect. Interviewee SH shared his experience that, “at that time, RMC did not have any experience in commercialisation, so it was a hard work because we need to do everything from the scratch”. Thus, RMC’s personnel should be trained to be well-versed with IP related documents, procedures and issues.

Another significant challenge concerns on the rights related to intellectual assets created in the course of employment. The misconception among the majority of academics is that their rights have been denied when university own their creations [10]. For example, interviewee SH emphasized that “we cannot simply commercialise it by our own because all the research products under the research grant are university properties”. Thus, academics should be explained of their rights under the law. In patent cases for example, section 20 of the Patents Act 1983 provides that all creations created in the course of employment are belong to the university. However, it should be noted that employee will be equitably remunerated if the invention acquires an economic value much greater than the parties could reasonably have foreseen initially. This means, academic researchers may claim their rights in terms of profit sharing, royalty or other incentives or rewards from the university if the actual value of their products exceeds their initial expectation.

4. CONCLUSIONS

This study focuses on challenges related to IPRs encountered by researchers in commercialization activity. While appropriate policy has been implemented, several challenges remain. The study found the majority of academics were unprepared in equipping themselves with IP knowledge and it related issues. This led to other notable issues such as difficulty in understanding the application process and procedures, identifying suitable IPRs for commercialisation and the division of their rights with the employer. The study suggests the dissemination of IPRs knowledge and awareness towards academics and RMC’s personnel is crucial in encouraging active participation towards commercialization activity in the university.

REFERENCES

Creative industry learning and development towards craft product: Critical success factors of technopreneurship

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Keywords: Technopreneurship; critical success factors (CSF)

ABSTRACT – Technopreneurship is one of the critical subjects in business theme that may assume imperative part in making of upper hand in different enterprises and organizations. The main purpose of this study focused on the relationship between Critical Success Factors/CSF (promotion, place, price, product and network & collaboration) and the successful of craft technopreneurship. A total of 50 entrepreneurs from different areas in Melaka took part in the survey. The results of the analysis indicated product as the most significant factor for the success of craft technopreneurship. For the practicality of this study, technopreneurship can be well implemented through education to ensure potential entrepreneur and the sustainability of the business.

1. INTRODUCTION

Technopreneurship is innovative application of technical science and knowledge individually or by a group of persons, who create and manage a business, it is not a product but a process of synthesis in engineering the future of a person, an organization, a nation and the world [1]. The entrepreneurs have to fight in this intense competition in order to be able to gain their own market shares and formulating their organisation strategy for better performances [2–4]. The creativity and knowledge of entrepreneur enable to create anything based on their perspectives. For sustainable of a creative industry specifically craft, the individual characteristic (technopreneur) should be developed through education to ensure its sustainability. Entrepreneurial education creates change in expectation, market structure, availability resources and new knowledge emerges [5] to the next generation.

Creative industries is mobilised and in conjunction with the production of individual expertise and talent based on creativity, innovation and technology towards economic growth [6]. Creative industry is a new approach for Malaysian government to establish relation to the needs of idea to develop arts composition through creativity in several sectors [7]. Craft product is a creative industry in Malaysia that has many forms in relation to the cultural. To go further, this study identify a few factors contributes to the successful of craft entrepreneur. This study utilised Critical Success Factor (CSF) that is necessary for an organization to achieve its objectives. A work by Musa et al. [8] examined the development of a successful business by an organisation that’s implementing green practices and be able to compete domestically and globally. For this study, the successful of CSFs are identified by its promotion, place, price, product, and network & collaboration as a factor towards the successful of craft technopreneurship.

For purpose of this study is to identify the relationship between the relationship between CSF (promotion, place, price, product and network & collaboration) and success of craft entrepreneurs in Melaka. Figure 1 shows the theoretical framework of the study. Therefore, H1, H2, H3, H4 and H5 there is positive relationship to success of craft technopreneurship.

2. METHODOLOGY

The method used in sampling is convenience sampling, which is a type of random sampling technique. All the items of the questionnaire were measured on a 5-point Likert scale. A total of 50 entrepreneurs from different areas in Melaka (Jonker Walk Street, Muzium Samudera and Ayer Keroh Craft Entrepreneur) took part in the survey. For data analyzing, this study applies correlation and Multi Regression Analysis (MRA).

3. RESULTS AND DISCUSSION

For the correlation analysis, promotion (.682**/p = 0.00), place (.610**/p= 0.00), price (.691**/p=0.00), product (0.758**/p=0.00) and NC (0.543**/p=0.00)
showed a positive relationship. Product shows the highest correlation with success of craft entrepreneur. MRA, \( R^2 = .437 \) implies that the independent variables explained 43.7% of the variability of the dependent variable (success of craft entrepreneurs). Table 1 showed a summary of the statistical analysis. Figure 2 shows statistical diagram.

<table>
<thead>
<tr>
<th>CSFs</th>
<th>Correlation</th>
<th>p value (&lt;0.01)</th>
<th>( R^2 )</th>
<th>MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion</td>
<td>0.682***</td>
<td>0.00</td>
<td>.466</td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td>0.610***</td>
<td>0.00</td>
<td>.372</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>0.691***</td>
<td>0.00</td>
<td>.477</td>
<td>( R^2 = .437 )</td>
</tr>
<tr>
<td>Product</td>
<td>0.758***</td>
<td>0.00</td>
<td>.574</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>0.543***</td>
<td>0.00</td>
<td>.295</td>
<td></td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

**Figure 2 Statistical diagram.**

### 4. CONCLUSION

The paper has proposed a framework to respond to the nature of CSF in role of technopreneurial. All the factors found positive relationship which is that kind of variables as a tools to ensure successful in craft technopreneurship. In the education filed, all factors should be taken into account in delivering knowledge to the potential craft entrepreneur. The educational system must be fitted with the knowledge of the cultural to adapt CSF in terms of craft technopreneurship. The study also provides a most correlated factor (product) contributed to success of craft technopreneurship among craft entrepreneur in Melaka. Roles of educational become crucial tools to guide next generation who intention to build up craft industry according to the knowledge gained on institutions. The study also has limited the size of sample; it should be expanded by including more craft entrepreneur in the survey. A larger sample with more assorted qualities would have profited the study. Another conceivable change in the study could have been interviewing directly participants. Personal interviews could elicit greater information regarding participants’ knowledge and attitudes. This method could have included imperative subjective information and more prominent understanding into the participants’ idea and assessments.

### REFERENCES


Emotional intelligence and stress among SME entrepreneurs in Melaka: A case of entrepreneurial education

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Keywords: Emotional intelligence; entrepreneurial education

ABSTRACT – Emotional intelligence (EI) is an important topic in management and entrepreneurial education. The main purpose of this study focused on the relationship between Emotional Intelligence (Cognition & Ability/CA, Understanding Emotions /UE, and Emotional Decision Making /ED) and stress among SMEs. A total of 70 entrepreneurs from different areas in Melaka took part in the survey. The results of the analysis indicated CA and ED have a positive relationship with stress among SMEs. For the practicality of this study, EI can be well implemented through education in demanding a sound stress management to all potential entrepreneurs.

1. INTRODUCTION

Entrepreneurial education (EE) creates change in expectation, market structure, availability resources and new knowledge emerges [1] to the next generation. EE provides young graduates with enough training and support that will enable them to establish a career in SME businesses because they have to fight in this intense competition in order to be able to gain their own market shares [2,3]. Although the success of SMEs business is very much depending on its overall performances [4,5], to become entrepreneur, the person must also capable of demonstrating high level of self-confidence, trustworthiness, achievement and service orientation, teamwork and [6,7]. This behaviour explained on the emotional intelligence (EI) toward the entrepreneur. EI has been hypothesised to be an extremely important factor for predicting entrepreneurial success [8] and it remains controversial because only a few studies that tested [9]. However, stress among entrepreneurs is much higher compared with other job occupations [10]. In business, uncertain or unknown matters create anxiety which in turn causes stress in many people, as opposed to the more universal feeling of fear caused by known or understood threats [11].

Many scholars believed that entrepreneurial stress and emotional intelligence are separately constructs, but highly interrelated. EI is a set of unknown abilities and skills that increases the individual’s ability against stress [12]. Previous study by [12,13] mentioned the element of EI are cognition and ability (CA) to express emotions, understanding others’ emotions (UE) and emotional decision making (ED).

This study identified the relationship between emotional intelligence and stress among SME entrepreneurs in Melaka. Figure 1 shows the research framework of the study. The study focused on the organizational context in terms of entrepreneurial behaviour. The model is therefore estimated the hypothesis, H1, H2 and H3 as positively related to stress.

2. METHODOLOGY

The method used in this study was convenience sampling, which is the type of random sampling technique. All the items of the questionnaire were measured on a 5-point Likert scale. A total of 70 entrepreneurs from different areas in Melaka took part in the survey. For data analyzing, this study applied correlation and Multi Regression Analysis (MRA).

3. RESULTS AND DISCUSSION

For the correlation analysis, CA (.368**/p = 0.00) and ED (.324**/p = 0.00) showed a positive relationship with stress but is a weak correlation. While, UE (.0266/p=0.06) showed no relationship to stress. From this result, H1 and H2 were accepted.

MRA, R² =.402 implies that the independent variables (CA and ED) explain 40.2% of the variability of the dependent variable (stress). Table 1 showed a summary of the statistical analysis. Figure 2 shows statistical
diagram.

H. Darvish and A. Nasrollahi [12] stated, CA is a controlling emotions to improve the growth of emotion and ration which can build a deeper and richer understanding of how individual learn to see opportunities [14]. A. Fabio and M. Kenny stressed [13], EI construct is also conceptually relevant and consistently associated with career ED. Additionally, EI consisting of the interrelated abilities of effectively perceiving emotion in the self and others, using emotion to enhance decision making [15].

**Table 1 Summary of analysis.**

<table>
<thead>
<tr>
<th></th>
<th>Correlation</th>
<th>value (&lt;0.01)</th>
<th>R²</th>
<th>MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>0.368**</td>
<td>0.00</td>
<td>0.460</td>
<td></td>
</tr>
<tr>
<td>ED</td>
<td>0.368**</td>
<td>0.00</td>
<td>0.344</td>
<td>R²= 0.402</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

![Figure 2 Statistical diagram.](image)

4. CONCLUSION

The study provides a better understanding on CA and ED in becoming the most influencing factors contributed to the abilities and skills that increase the individual’s ability against stress among SMEs in Melaka. The roles of educational institution become crucial in providing tools to guide the next generation who has the intention to build up business in ensuring stress factor would not go against by them.

The study also has limited the size of sample; it should be expanded by including more SMEs in the survey. A larger sample with more assorted qualities would have profited the study. Another conceivable change in the study could have been interviewing participants directly. Personal interviews could elicit greater information regarding participants’ knowledge and attitudes. This method could have included imperative subjective information and more prominent understanding into the participants’ idea and assessments.

REFERENCES


The implementation of global positioning system (GPS) towards logistic service provider (LSP)

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Keywords: Engineering management; logistic service provider; GPS

ABSTRACT – The application of engineering principal has now become a strategic tool to ensure sustainability in the organization. The main purpose of this study focused on the characteristics of logistics service provider (LSP) (cost efficiency/CE, customer satisfaction/CS, and security and safety/SS) that affect the adoption of GPS in Malaysia. A total of 450 questionnaires were distributed via email to a logistic service provider (LSP). The reliability test, descriptive analysis and correlation analysis has been performed, and the results of the analysis indicated CE as the most significant factor for LSP to adopt GPS.

1. INTRODUCTION

Engineering Management (EM) is a field that contemplates on the application of engineering principles for the effective planning and efficient operations of managing manufacturing or industrial [1,2]. Lots of previous studies in Malaysia apply principles of technology to ensure sustainability of the organization [3,4]. The application of technology in the LSP has been regarded as a strategic industry in the 21st century. In fact, the logistics had already become prominent and acknowledged as a critical factor of competitive advantage in developed countries [5]. There are challenges facing the logistics industry such as the need to ensure that the service providers subscribe to industry practices such as “just-in-time” and to point deliveries which demand accurate and timely [6].

The technology needed to support real-time logistics requires mobile communication such as GPS [7,8]. GPS technologies are the latest technology used in communications that may help to solve LSP companies’ problems and provide real-time data and information [9,10]. Thus, in this research, the main subject of concern focused on the characteristics of GPS that affecting the adoption of GPS in Malaysia. Several researches have been done in the area of innovation management [11–13] looking at factors contributed to the performances of organisation that was influenced by the characteristics of the innovation adopted by them. For this research, we focused only on the customer satisfaction, cost efficiency, and safety & security. Those dimensions used as the indicator of characteristics of LSP [14–16]. Figure 1 showed the theoretical framework for the adoption of GPS applied to this research.

2. METHODOLOGY

The method used in sampling was a convenience sampling, which is a type of non-random probability sampling technique. All the items of the questionnaire were measured on a 5-point Likert scale. The respondents of this study were top management of the company. A total of 450 questionnaires were distributed via email since December 2014 but only 325 were returned. For data analyzing, this study applies descriptive analysis, reliability test, correlation and Multi Regression Analysis (MRA).

3. RESULTS AND DISCUSSION

For reliable test, Cronbach’s alpha for all variables were acceptable with .622 (moderate) for CE, .775 (good) for CS and .888 (very good) for SS. While, descriptive analysis showed CE perceived to be the highest (mean=4.47, SD=.575), CS (mean=4.34, SD=.674) and SS (mean= 4.33, SD= .652). For the correlation analysis, CE showed a good correlation with the adoption of GPS (.554**/p <.01), the other variables showed a correlation with the adoption of GPS, but does not exceed the correlation between CE and adoption of GPS. Multiple Regression Analysis (MRA), a value of R=. 730 indicate a good level of prediction. R² =.532 implies that the independent variables (CE, CS and SS) explain 53.2% of the variability of the dependent variable (adoption of GPS). Table 1 shows a summary of the analysis.
This study has revealed the existence of a significant relationship between CE and the adoption of GPS. The correlation analysis has interpreted a good positive correlation between CE and the adoption of GPS. According to this analysis, the result shows there was a significant relationship between independent and dependent variable of this study. According to descriptive result, most respondent agreed that the adoption of GPS brings cost efficiency toward company when they implemented it.

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Descriptive</th>
<th>Correlation</th>
<th>MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>.660</td>
<td>4.77(mean)</td>
<td>.554**</td>
</tr>
<tr>
<td></td>
<td>.575(SD)</td>
<td>p&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>CS</td>
<td>.775</td>
<td>4.34(mean)</td>
<td>.162**</td>
</tr>
<tr>
<td></td>
<td>.674(SD)</td>
<td>p&lt;0.01</td>
<td>R=.730</td>
</tr>
<tr>
<td>SS</td>
<td>.888</td>
<td>4.32(mean)</td>
<td>.504**</td>
</tr>
<tr>
<td></td>
<td>.654(SD)</td>
<td>p&lt;0.01</td>
<td>R² = .532</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).

4. CONCLUSION

This study provides a better understanding on how the characteristics of the logistics service provider affect the adoption of GPS in the company. Results of this study mentioned CE contributes to the adoption of GPS and it was accurate with the study by [17]. The study mentioned, the application of GPS contributes to the cost efficiency (i.e. reduced costs) for LSP. The paper also mentioned the most dominant characteristic of LSP towards the adoption of GPS that brings better the company implement this technology. Overall, it can be concluded that there were some characteristics of logistics service provider that can affect the adoption of GPS. However, only three variables were taken in this study to represent the characteristics of LSP towards the adoption of GPS. The study also has limited the size of sample; it should be expanded by included more company of LSP in the survey. A larger sample with more assorted qualities would have profitied the study. Another conceivable change in the study could have been direct interviewing to participants. Personal interviews could elicit greater information regarding participants’ knowledge and attitudes. This method could have included imperative subjective information and more prominent understanding into the participants' idea and assessments.

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