

EFFECTS OF TECHNOLOGY TRANSFER ON THE SOCIAL STRUCTURE: AN EMPIRICAL STUDY OF A MALAYSIAN MANUFACTURING COMPANY. PRELIMINARY RESEARCH REPORT OF AUTOCLAVE PILOT SURVEY

Noor Ashikin Said^{a*}, Eric Olmedo^a, Che Zulhaimie Abdullah^b, Razman Shah Rajab^c

^aInstitute of Ethnic Studies (KITA), Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

^bHuman Capital and Administration, CTRM Aerocomposite, 75350 Batu Berendam, Melaka, Malaysia

^cAerospace Malaysia Innovation Centre (AMIC), Composites Technology City, 75350 Batu Berendam, Melaka, Malaysia

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*Corresponding author
noorashikin@ukm.my

Abstract

Worldwide employee turnover in 2014 had hit the average of 18.5% (voluntary and involuntarily) (Radford 2014). Without exception, Malaysia's aerospace manufacturing industries have dealt with the same issue of high turnover rate for a long time. The human resource management of Composite Research Technology Malaysia (CTRM) has stepped out as the pioneer to be involved in an experiment to mitigate this issue. Therefore, there is a need to come out with a virtualized training tool that can help in cutting the cost and the duration of training new workers. An exploratory research has been conducted focusing on the linguistics aspect of the training tool. This report aimed to profile the technicians and to detect gaps between what is perceived and the actual reality on the floor, so that the technology could be transferred effectively. Semi-structured interviews, direct observation and focus group were used as the methodological approach to collect the data. The results indicate that their English competency is generally low. Malay language is used in all aspects of verbal communication. The glossary used for the instruction board is not comprehensible enough for the technicians and they have their own specific way of perceiving time at workplace.

Keywords: Virtualized; linguistics; technology; aerospace manufacturing; Malaysia

Abstrak

Kadar tukar-ganti pekerja di seluruh dunia pada tahun 2014 telah mencatatkan purata sebanyak 18.5% (sukarela dan bukan sukarela) (Radford 2014). Tanpa pengecualian, industri pembuatan aeroangkasa Malaysia telah bergelut dengan isu yang sama untuk tempoh masa yang lama. Jabatan pengurusan sumber manusia Penyelidikan Teknologi Komposit Malaysia (CTRM) telah maju ke hadapan sebagai perintis untuk terlibat dalam eksperimen bagi menangani isu tersebut. Oleh itu, terdapat keperluan untuk mencipta alat latihan maya yang boleh membantu dalam mengurangkan kos dan jangka masa latihan pekerja baru. Satu kajian penerokaan yang lebih memberikan tumpuan kepada aspek linguistik alat latihan maya tersebut telah dijalankan. Laporan ini bertujuan untuk mendalami profil juruteknik dan mengesan jurang antara tanggapan umum dan realiti sebenar di kilang pembuatan, supaya teknologi latihan maya boleh diaplikasikan dengan berkesan. Temu bual separa berstruktur, pemerhatian langsung dan kumpulan fokus telah digunakan sebagai pendekatan metodologi untuk mengumpul data. Keputusan menunjukkan bahawa tahap penggunaan Bahasa Inggeris juruteknik secara amnya rendah. Bahasa Melayu digunakan dalam semua aspek komunikasi lisan. Glosari yang digunakan dalam papan arahan tidak dapat difahami dengan baik oleh juruteknik dan mereka mempunyai cara tertentu mengelaskan masa di tempat kerja.

Kata kunci: Maya, linguistik, teknologi, pembuatan aeroangkasa; Malaysia

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1.0 INTRODUCTION

The huge economy's influences on all other aspects of society and social reproduction have made the study of work, industry, and economic institutions an important part of sociology. Work is closely intertwined with social structures, social processes, and especially social inequality. The sociology of work rooted from the classic sociological theorists of Marx (1848), Weber (1975) and Durkheim (1895). Marx was the pioneer to critically examine the conditions of work in the new factories around England during the industrial revolution, scrutinizing how the transition from working independently to working inside a factory for a boss (employee) resulted in deskilling and alienation. Marxist scholars are nurtured to look at power dynamics at the workplace and different forms of managerial control of labor. Durkheim (1895) was questioning with how societies achieved stability based on traditions, customs and norms. He believes that traditional society of peasants and lords had a very similar set of customs and norms based around feudal obligations and familial relationships.

Under the new market norms of individualism and competition, has made Durkheim pondered on what would be the basis for social stability. He thought that various industrial and occupational associations could provide for social stability. There are many such associations today across the economy, which embodied medical, law and community institution. Sociologists of Durkheimian allegiance later started looking into the development of professions. Weber (1975) has also focused on the transition from traditional to modern society, but his analysis was on the development of new forms of rationality and how they provide a basis for new types of authority as needed in modern bureaucratic organizations.

CTRM (Composite Technology Research Malaysia), as an organization, can be seen as a micro empirical field to read part of the social reality of the Malaysian macro society. CTRM was incorporated in 1990 and fully commenced operations in 1991. Its nature of business relates to manufacturing composites components, aircraft partial assembly (wings), maintenance, system integration, upgrade and refurbishment. The manufacturing and composite repair facility was first inaugurated in 1996, situated in Batu Berendam, Melaka, Malaysia. Among its major commercial clients are international, Airbus and Boeing for which it is known as both a first-tier and second-tier supplier in designing, developing and manufacturing aircraft parts. It has also participated as a strategic partner in Mitsubishi Regional jet, the development of fan cowls for the Boeing B787, Bombardier C series and, in the near future, the Airbus A350. In 2014, CTRM was streamlined and restructured in line with international standard of aerospace manufacturing sector. In effort to mitigate the problem of high attrition rate, a research group

was established, namely VIRISTAM, to design a virtualized training tool to train new technicians of the plant. The main objectives were to cut the cost of training as they handle (and potentially discard) expensive materials such as composite panels, and to shorten the duration of training as well. The workplace's scenarios are divided into two: micro (small group, face-to-face interactions) and macro (large-scale social processes).

KITA, the Institute of Ethnic Studies of the National University of Malaysia (UKM), acts as the validation team, being responsible of validating the training system in its different aspects of linguistics, cognitive psychology, sociology and anthropology-based screenings. The validation method goes penetrates into the core of the micro level analysis. The autoclave was selected as the pilot-case for this first stage of experimentation. An exploratory survey was conducted at the autoclave department, focusing mainly on the linguistic validation level. The objective of this exploratory survey was to locate the linguistic convergence point relating to the set of instructions given to autoclave technicians, and aiming at being intelligible and effectively implemented, while minimizing ergonomic and safety risks. The initial research question relates to a long-standing issue in sociology as well as anthropology: can the micro-organization (the factory) be viewed as a hologrammic version of the macro organization (the society)? Sociology of work and organizations has successfully narrated that political, social and cultural institutions, together with power relations remain fundamental to analyze life at work, the functioning of the market and organizational behavior as well. Referring to the case of Steve Jobs, the sociological lesson would be that beyond the popular narrative of individual success and entrepreneurship, much of what credit has been given for him is actually the result of a team work labor in their Research and Development (R&D).

2.0 LITERATURE REVIEW

In order to aid understanding of readers, this literature review will be parted into two sections; the perks of using Virtual Reality (VR) as well as human aspects of technology and social change.

2.1 Virtual Immersive Reality (VR)

Based on several years of research evidence, interest for VR as an instructional technology has been quite high among those who have already experienced it. Selwood et al. [13] suggested that VR has strong potential to be a useful educational tool because it can affect the social, emotional processes of learners and their intellectual. It was also supported by Sulbaran and Baker [14] that the spreading of the use

of VR on the web as an important kick-start. They concluded that their students who were taught via VR showed high levels of engagement and knowledge retention. Winn et al. [19] also believed that there are three factors act as strong foundation for the capabilities and impact of VR such as immersion, interaction, and lastly the ability to engage and motivate learners. The most prominent field that has used VR actively in research is the field of medical and dental education. Riva's [10] extensive insight of virtual environments in medical training has agreed that despite some limitations, its advantages and benefits have been more effective than traditional methods. A review of medical and dental training literature spurs large numbers of research articles reporting the advantages of VR techniques application.

However, there are also some precautions to be taken into account in using VR. Most of VR researchers and users tend to agree that the technology is best used mostly as supplementary tool to basic live training, rather than replacing it totally. For example, in the process of auto spray painting. Painters' training will not be completed until they can demonstrate total or ample competency in the process of painting. Likewise, in health education field, it has been reported by Urbankova and Lichtenthal [17] and William [18] that with guidance by faculty teachers, using VR technology has alleviated the performance of learners over a controlled group that is not exposed to the technology beforehand. Besides that, McDonald, Quinn, Keogh, and Hussey [9] argued that there was not so much publication on VR's training effectiveness, as compared to traditional training method. They concluded that VR and traditional training should go together as they cannot survive without each other. On the other hand, Jeffries et. al [8] found that VR is on par or even a better training to replaced hands-on training method. There is still no solid argument to validate those viewpoints, though.

The state of immersion into virtual reality is the feeling of being physically present in a non-physical world. The perception given to the subject is created by attaching the user of the VR system in sound, images or other variables that provide a total mimic of the real environment. The state of immersion can also be explained when the subject's physical awareness is transformed by being wrapped into the virtualized environment. Ernest W. Adams [6] dictated that immersion could be separated into four main categories such as strategic immersion, tactical immersion, spatial immersion and narrative immersion. In tactical immersion, it is mainly experienced when performing tactile operations that involve skill. For example, subject feels absorbed in the zone while conducting actions along the way. Strategic immersion on the other hand is associated with mental challenge. It happens in combat sports, when a person experiences the immersion, while analyzing the perfect solution among a broad array of possibilities. Narrative immersion exists when

players become involved in a story that they experience mostly while watching movies or reading. Lastly, spatial immersion that takes place when subject feels the simulated world is perceptually convincing. The subject is so much into it until the realm of reality and virtual can be hardly guessed.

2.2 Technology And Social Change

Societies are always dynamic and evolving, especially in the transformation of the social order. The social structure changes along with time and new environment. It could be seen as result in adapting and catching on with the globalized world. The changes that occurred not only in the direction of progress, but can also be directed towards regression. Pudjiwati Sajogyo [11] reviewed the characteristics of a modern society as learning about the process of important changes in the social structure of the nation-state, which has, became modern. There are two characteristics of a modern society as argued by Sajogyo [11]; the level of formal education is high and evenly and strong belief on the benefits of science and technology as a means for social well-being. Modern human characteristics which determine modernization is defined as receptive to new experiences and new discoveries, ready to accept changes, and believe in the efficacy of science and technology in improving the well-being of mankind. In the aspect of technology, it can be understood as simply a man's attempt to make life more prosperous, easier, better and more comfortable. It affects the existing culture in expansion of employment, pressing the shift of labor, avoid social and cultural conflict and increase the income equally.

Modernization does not just belong to people who live in urban areas, but has now made possible by the facilities and infrastructure in the field of telecommunications which has greatly facilitate human life. Likewise in the agricultural community, which is generally identical to rural areas will not be spared from modernization euphoria. The farming community, which was once considered, retarded the uptake and mastery of technology in various forms now inevitably needs the touch of technology in aiding the agricultural activities. A change could be facilitated or caused internally or externally. In a community, social and cultural changes can occur because of the community itself or from outside of the community. For example, an internal drive for social change could be the emergence of various forms of conflict (conflict) in society, rebellion or revolution so as to trigger the occurrence of major changes, and most importantly when there are new discoveries developed in the community, whether that is a new discovery (discovery), or a new discovery of the invention to refine the old (invention). On the other hand, external drive for a change could be the effects of natural disasters, war or influence of another culture (Bijker, Hughes & Pinch 2013). In this case, it is the influence of another

culture and the new discovery of using VR as a training tool. It is an evolution within the society in adapting to environmental conditions and new conditions that arise due to the growth of society.

3.0 THEORY AND CONCEPT

This paper is using the theory of Bourdieu's social reproduction as main analytical tool. Bourdieu understands sociology as a combat sport that explains the underlying structures of social life has given a huge impact on the academic field, especially in his home origin, France. Bourdieu's [3] social reproduction thesis has focused research on the relation between education, family, and social class. Bourdieu pointed out that education executes an important role in abetting the reproduction process of social exclusion and social inequality. He imposed that cultural capital equals to inequalities in social class and it is argued by Bourdieu to be strengthened in schools where the school becomes a central agent of social exclusion and reproduction by rewarding students who possess such capital and by penalizing others who do not.

3.1 Cultural Capital

Bourdieu's idea in cultural capital is heavily influenced by the capital theory of Karl Marx. They agreed on the same thing, the more capital one has, the more powerful a position one occupies in social life. While Marx sees in economical aspect, the upper class dictated their position from the working class by monopolizing the means of production; Bourdieu sees it more in the society and culture. He argued that the capital will shape the foundation of social life and alleviates or degrades one's position within the social order.

Bourdieu's concept of cultural capital refers to symbolic elements such as intelligence, the way one's talk, tastes, posture, clothing, mannerisms, material belongings, credentials and many more, that one acquires through being part of a particular social class. Sharing the same forms of cultural capital will create a sense of collective identity and group position. However, Bourdieu also pointed out that social inequality is mainly derived from cultural capital. Certain forms of cultural capital are valued over others, which will hinder one's social mobility. As argued by Bourdieu, cultural capital is grouped into three such as embodied, objectified, and institutionalized. Dialect or accent of a person is an example of embodied cultural capital, while objectified state of capital is more like a mansion or a diamond ring. In its institutionalized form, cultural capital is seen within titles and qualifications that symbolize authority and cultural competence.

3.2 Habitus

Habitus is one of Bourdieu's most influential concepts. It refers to the physical embodiment of cultural capital, to the deeply ingrained habits, skills, and dispositions that we acquired along our life experiences. We just know what to do in a particular situation. In a particular situation, our habitus guides us to excellently navigate through the social environments. It is mainly created through social process and can be smoothly transferrable to others. It is a general constitution (individual's personality structure) that is structured daily in everyday life.

Habitus also means the "taste" for cultural objects such as food, art and style. In *Distinction* (1996), as one of his major work, Bourdieu links French citizens' tastes in art to their social class positions, arguing that aesthetic sensibilities are shaped by the culturally ingrained habitus. The upper class produces and defines culture with a high-class artwork, while the lower class will just accept them as it is because they do not have enough means to decipher the higher cultural capital's artwork. Bourdieu often noted, it was so ingrained that people unconsciously act in a certain way without even them realizing. How people present themselves will picture their social status. The difference for aesthetic taste has produced class struggle within the society. The taste is the product of the structure, producer of practice and reproduction of the structure.

4.0 MATERIALS AND METHODOLOGY

This research was conducted in the nature of inductive reasoning. It applied qualitative methodology, which is more open-ended and exploratory, especially at the beginning. The team resorted into three different approaches in collecting data. First, semi-structured interviews were conducted, consisting of 8 technicians of various job-descriptions. The main objective of the interviews was to track the socialization path of the staff; in short, to know whom they are. It was conducted upon voluntary basis. Interviews were at first conducted in English, but the technicians were not comfortable with that language, so interviews had to be shifted to Malay.

The second data collection method put in place was direct observation: participant observation can be carried out only at a later stage of the research, for confidentiality reasons. The main objective of this first level of testing was to identify the linguistics convergence threshold, or intelligibility convergence point, between theoretical language used for instructions and actual language or "communication code" in the practice of everyday life at the workplace. Examined medium of written communication was a specific text inserted in the Standard Operating Procedures (SOP) manual, and namely the instruction boards to workers for

autoclave technicians destined to be captured into the virtual reality training program. Lastly, a focus group was conducted to identify convergence threshold between what is expected by the management and the actual situation. This approach was used to pave the way for open and frank discussion about many issues. The technicians were treated Pizza for dinner (their choice), before the discussion began.

Discussion was conducted in a room deemed conducive; a big space with tables and chairs, easy for the team to set up video a recording apparatus, relatively sheltered from the background noise generated by certain pieces of equipment, obviously fully operated during the night shift. Two moderators led the discussion with two observers. Our informants consisted of 8 technicians; 4 technicians participated in the previous semi-structured interviews and 4 others did not. As to address the differences, they were divided into 2 different groups to avoid bias, the new comers acting as the control group. At the very end of the discussion, the bias was disconfirmed. No difference was observed, neither in their narrating patterns or contents, nor in their behavior. One of the observers translated four of the boards into a pattern of Malay that ought to be familiar with them. The boards were then given to both groups for them to look and comment about what they think of the sentence structure of the instruction. They were given pens to jot down their comments while discussing with the peers. In some ways, checking the translation got the technician to feel at ease, in charge and willing to talk freely. The experience was recorded on video and audio devices for further analysis.

5.0 RESULTS

From the survey conducted, three main findings have been induced. First, the choices of glossary or terminology used for the instruction boards. Some of the words either were not familiar to them or they uttered totally different word for the same meaning. As for example, the term "Christmas Tree" was referred to as "cart caddy", "forklift" was referred to as "stacker" and the term "path guide" was referred to as "yellow line". At this point, there is a need to stress upon the dichotomy between the written and oral modes of communication. As per written communication code, analyses of two log books ("Communication Book" in the Auto-clave control room and "Instruction Log-Book" from the training centre) revealed constant usage of code-mixing (sprinkling of isolated English words like "problem-issue", "switch", "end-of-cure", etc.) with Engineering-English and punctually code-switching (i.e "no incident to report", or "curing-process completed on time"). As far as oral communication is concerned, there were a number of English terms and phrases used but they were highly assimilated

(phonetically) into Malay. They were loanwords of high frequency, like "polis", "setem", "opis" and the like (giar, brek, ekzos etc). It is a highly specialized register of Malay.

The second finding relates to didactics' issues. They portrayed some difficulties in understanding given instructions. According to all informants, some of the words or expressions used in the instruction boards are too vague and/or too broad. A striking example is the word "properly": one of the technicians commented that the term is not self-explanatory, "to explain what we do they should replace 'properly' by 'you have to push the button, wait until the lock clicks automatically and lock the ring". Informants also commented that the instructions conveyed on the board constitute extreme shortcuts from the actual procedure. The technicians agreed that it has missed a lot of steps that is crucial in handling the autoclave machine. Some of the instruction even does not belong to their respective department.

The third finding concerns representations of temporality by autoclave technicians. This explains the way workers perceive time at the workplace. Their perception is linear and sequential. They divided the time frame into sections of "before cure – curing process – end cure – after cure". They asserted that by using this concept of time framework, the process can be seen clearer and it will smoothen the operation of autoclave machine.

6.0 DISCUSSION

The direct observation concludes that the reality is divided into two. The autoclave world is not homogenous. Autoclave department consisted of Block 1, Block 3 and Block 5. As seen on site, the Block 1 and Block 5 building are not the same in terms of ergonomic and safety. Besides, Block 5 building has different operating system because it houses different autoclave machine of different sizes and manufacturers, which cannot be found in Block 1 building. As for that matter, the profile and qualification of the technician are not the same too. They have to be trained with new knowledge in order to master the different operating system. Generalization is not applicable in this environment. It is best to follow the existing mind mapping of the technicians – the actual routine of working environment to keep their level of motivation at work. On top of that, the linguistic pattern of colloquial Malay with huge assimilation of English terms and phrases should be retained to design instruction board that are going to be captured in VR training software. The knowledge can be transferred more effective in a way that they are used to because as the result indicate, most of their verbal communication whether among workers or with the management, they use a highly specialized register of Malay, that seem to describe better specific situations in their communication code patterns. Both

training and coaching of new workers were also conducted using Malay language as the medium of interaction and there was no uniformity in the style of transferring the knowledge to the learner.

6.1 Serendipity And Rising Matters

6.1.1 Reality gap

There seem to be a somehow classic gap between an earlier glamorous representation of aerospace industry and the mundane reality of a manufacturing production line without even an aircraft in sight. As seeing is believing, is it extremely important for them to take a look at their job routine in a bigger scale, on how they are contributing to the process of building an airplane. It will increase their motivational level to get their job done and to feel as a proud liner of an established gigantic company. This factor should not be underestimated as it may lead to increased staff turnover.

6.1.2 Leads for research continuation

The double-homogeneity hypothesis (workers' profile and nature of work) needs to be empirically verified. In the sample collected, the autoclave technicians' population is relatively homogenous (Malay ethnicity, male gender, qualification level, and majority of them living in Melaka geographical area). The take-over by DRB HICOM streamlined production standards has altered some of the job descriptions and job requirements of CTRM. The Block 5 appears to display different features in terms of equipment and size or surface. There might be a need for differentiated profile of workers, i.e. level of skills. Therefore, the VR training tool must acknowledge this dichotomy.

6.1.3 Learning Curve

It must be understood that the virtual reality-training tool must not be analyzed in a silo. At CTRM plant, the VR training platform is only a small part of a broader training system, including an academic training program at ACTC (Aero Composites' Training Centre) institution formerly known as CTRM Academy, as well a 6 month-to-1 year mentorship system at the workplace. What is of utmost importance is to locate the position and the role of the VR training program in the whole learning curve of the technicians. This positioning remains unclear at the present time.

6.2 Set Of Recommendations

6.2.1 Communication code

Re-write instruction boards, using communication code as described above for optimal training usefulness and effectiveness. Distinction must be made between written English and oral pronunciation if there is to be audio features, as English terms are not being pronounced in British or American-English fashion. If audio English uses such idioms, instructions will not be immediately intelligible by autoclave technicians.

6.2.2 Reality gap

VR training can be used periodically for refresher course, including more hedonistic features, so workers can reconnect with their earlier representation of aerospace industry as high-technology driven industry, thus potentially reducing staff attrition.

6.2.3 Career path and motivation

Motivation at the workplace can be further enhanced if the periodical VR training sessions can generate academic credits. These credits would cumulate and validate a part of their diploma or other relevant degrees, as per a RPEL system (Recognition of Prior Experiential Learning), the ACTC institution at CTRM being an accredited awarding body until diploma or higher diploma level.

6.3 Lessons learnt and Transferability

Some of the preliminary findings presented in this report are specific to the Autoclave department. Due to the usual quintessential constraints of a pilot-survey, time was of the essence, and the team did not dispose enough of it to conduct a longer and more meaningful participant observation. Therefore, it must be stressed upon that these preliminary findings are based on declarative data, and not on primary data stemming from observed actions at the workplace. Those limitations shall and must be overcome for the future actual use-cases. The real industry-relevant question is: what of these findings can be transferrable to the use-cases to come? If there is one thing to retain, it is probably the following recommendation:

The linguistic screening addressed not only language issues, but also – and more importantly so – the existence of a communication code peculiar to a specified group of workers. We have seen that the next generation of technicians that will be assigned to the Block 5 might be of a different profile. Therefore, their communication code will probably differ from the one investigated at Block 1. Consequently, to ensure effectiveness of training, it is

absolutely imperative to articulate the sociological profile of the studied workers' population with the usage of a communication code issued from a specific social milieu within the workplace. Both are interdependent. Concurrent investigation of these two variables (workers' sociological profile - situationally-constructed communication code) shall form a pivotal axis in further research as far as the linguistic validation level is concerned.

7.0 SOCIAL REPRODUCTION IN CTRM

Bourdieu [3] once argued that: "...cultural needs are the product of upbringing and education. All cultural practices are closely linked to educational level (length of schooling or qualification) and secondarily to social origin". As mentioned in his spectacular theory of social reproduction, the most prominent social fact that can be empirically observed in the CTRM plant is the question of cultural capital. Cultural capital refers to non-financial social assets that promote social mobility beyond economic means such as education, intellect, style of speech, dress, or physical appearance. People with higher volume of cultural capital will be able to define the 'taste' within the society. It simply affects how people conduct their life with one another and the social institution. Looking at the qualification, most of the technicians are school leavers, certificates' holders from Polytechnic schools their highest qualification being a Diploma. They are mostly Malays who speak vernacular language, a highly specialized register of Malay at the workplace. Comparatively, engineers possess higher cultural capital a mix of Malay, ethnic-Indians and ethnic-Chinese constitute this upper socio-professional group at CTRM. Besides their own vehicular language, they also have a good command of English, which alone creates some distance from the technicians on the floor.

With reference to the 'taste' of the technician, it is very different from the 'taste' of the engineer. The social group of engineers acts as the ruling class, while the technicians are the ruled ones. The cultural peculiarities of the groups mark them from one another. Bourdieu [3] has used the examples of class' difference in taste, as in in music, food, and leisure activities to define them. In this case, 'taste' is the communication code (language) that is used by the engineers in producing the instruction board for the virtual training tool. The technicians can hardly process the former. For example, "...make sure the panels do not collide with each other". "Collide" is considered as 'big word' (abstract and somehow condescending) by the technicians. Besides, terms used for these two discrete social classes are also different. Engineers use the term 'Christmas tree', while technicians use the term 'cart caddy' to explain a machine that alleviates the strain of manually pushing a cart. This variation of terms stems

from the different cultural capital and social distinction between classes.

The main point of the instruction board is actually to make sure that specified skills are successfully transferred to technicians, but it seems that the 'essence of class' is embedded into the style of the instruction board's language. Usage of 'big words' is not only unnecessary but also counterproductive, as it should connect to both cultural capital and communication code of this particular social group; technicians de facto use their own register of vernacular language. With reference to the preliminary findings of this paper, it appears that glossary and syntax, for a part, have to be refined and changed to fit the comprehension level of the technicians. In social reproduction theory, this is one of the ways for the engineers to maintain social stratification. Their cultural capital enables to determine the right 'taste' of the workplace.

For Bourdieu, one could say, the children of what he calls the "dominant class" are crucially advantaged over the children of subordinate classes in that they enter the educational system already well prepared to succeed within it. In their case, a clear continuity exists between the culture of the home and that of the school. These children will share a common mode of speech, style of social interaction and aesthetic orientation with their teachers, and neither the content of what they are taught (syllabus), nor the manner in which they are taught (pedagogy) are likely to appear strange to them. In contrast, for children from other class backgrounds, and especially for those of working-class or peasant origins, the school will represent an alien and indeed a hostile environment – a cultural and social world set apart from that of their families and communities, and one in which they are likely to feel out of place. Thus, while the children of the dominant class will progressively benefit from a positive interplay between the influences of home and school, children from less advantaged class backgrounds will find difficulties, and probably increasing difficulties, of adjustment. These latter children will then – other than in a few special cases – fail to reach the higher levels of the educational system, either because they are excluded by inadequate performance or because they in effect exclude themselves.

Bourdieu emphasized that the school and teachers play as the central agent of social exclusion and reproduction. DiMaggio [4] had once critiqued the idea by dissociating cultural capital and social class. He argues that cultural capitals of parents and their children were found to be largely independent of each other. The way they grow up is much more on their own ability, with emotional support from family. Teachers did not grade students on any cultural criterion, but they reward on effort. As Goldthorpe & Jackson [7] had suggested, far from reproducing inequality, schools are argued to complement, compensate for or indeed counter family influence. However, as seen in the field, it is evident that cultural

capital does contribute to the class struggle. The technicians associate themselves with their own class – which is lower. They were not confident communicating other than their own vehicular language, and were seen as holding themselves in most of the time. In the focus group session with the researchers, the technicians asked to be treated Pizza for dinner, which is not their usual fare, being not affordable. They may have seen the researchers as a group of higher social class and higher cultural capital; therefore they requested for a type of food, which is associated in their worldview with higher class' taste.

The 'taste' is nothing but 'cultural hegemony'. It acts as the social mechanism to ensure social reproduction and cultural reproduction of the 'ruling class' (read: engineers); 'ruling' in the sense that this is the social stratum within the organization that relays the instructions to the autoclave technicians. The 'taste' is the product of the structure, producer of the practice and again, reproduction of the structure.

8.0 CONCLUSION

The ultimate objective of this project is to design a training tool in virtual environment in order to impact positively on labor cost at CTRM plant, i.e. shortening training time and reduce scrap and discarded composite material on the production line. In line with this commission, the validation work packages aims at testing the usefulness and the effectiveness of the VR Training tool in-the-making. For the case of this pilot survey, only the first level of validation methodology, i.e. linguistics' screening, was experimented. If a consensus has been reached that "usefulness" is a pre-requisite to "effectiveness", preliminary findings seem to indicate that the "usefulness" threshold is yet to be reached as far of the issues of transfer of technical knowledge and acquisition of skills are concerned.

Lessons learnt from this toy case boil down to two main points: consistency and discrepancy. Consistency refers to seamless duplication of the vehicular language used for training on all media; in our case the instruction boards destined to be captured in virtual reality. Breaches in consistency may lead to misinterpretation eventually translated in poor productivity results or even safety risks. Discrepancy refers to the gap actually perceived between vehicular language used in the original instruction board ('Engineering English') and the communication code practiced at the workplace (colloquial Malay that resulted from a number of English terms and phrases used but they were highly assimilated into Malay). These preliminary findings for the linguistic level of validation can serve to bridge the discrepancy gap and ensure intelligibility consistency of given instructions.

To conclude, social reproduction appears more universal than culturally conditioned. Our empirical

field demonstrates that Bourdieu's theory is still relevant up to this time, at least situationally speaking in a multi-ethnic society such as Malaysia, to explain the social structure within CTRM. The findings of this preliminary research rendered clearly that the use of different communication codes between upper and lower strata within a micro-organization seem to contend for an alternative system of social distinction instead of taste: language, as an expression of social class' habitus.

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