

HIGHER LEARNING INSTITUTION: ROLES IN GENERATING HIGHLY POTENTIAL TECHNOLOGY WORKERS FOR THE INDUSTRY

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Abstract

The RMK 11 set out to catapult the nation into its high income nation vision of 2020. As set out in the plan, the national economy not only requires knowledge workers for the industry but also workforce who create employment. This strategy requires high level of innovation, thus potentially creative and innovative graduates.

This paper is written with the objective of highlighting how a higher learning institution in this country could generate these workforce?

The study set out with the investigation of what factors other than curriculum and pedagogy that would influence graduates creativity and innovative potential summarised as creative capacity [1].

Learning from studies and model put forward by Amabile et al [2], the study was made to focus on how a higher learning institution can emulate an industry behaviour. The hypothesis stands as how teaching staff perception on the institution innovation supporting climate influences student's innovativeness and creativity, as how the industry workforce do?

Two research questions were being addressed by the study. First is how much student's perception of the institution climate that supports innovation and creativity, is influenced by the teaching staff perception. The second question is how this perception does supports student's potential creativity and innovativeness.

To pursue this study, Amabile et al [2] ten dimensions model on measuring climate supporting innovation and creativity in an organisation is used. Surveys were conducted capturing 47 respondents (n=47) from the higher learning institution teaching faculty and 122 respondents (n=122) from the students of the same institution. To address the second question, the TTCT model [3] were used to help determine these students' creativity potential.

As a second assessment to enhance the validity of the findings, these students were also exposed to the Bandura [4] model of individual creative self-efficacy perception questionnaires.

The data when analysed revealed two important phenomena. First, the standard deviation of the teaching faculty and the students follows a very close shaped perceived profile on climate supporting innovative, indicating strong influence from teaching faculty on the students' perception.

The second observation shows that the student's creativity potential measured by their ideas in term of quantity and categories relates to fluency and flexibilities as advocated by Guilford [5], are higher for those students having higher perception scores in the organisation innovation support climate.

The third observation, reinforced the second observation when the students' creative self-efficacy

perception correlate with their organisation climate perception scores.

It can therefore be concluded that, ensuring higher level of perception on the higher learning institution innovation supportive climate among the teaching faculty can be one of the strategy to generate graduates with high creativity and innovation potential.

Keywords: Innovation supporting climate; Creativity potential; creativity capacity; Creative self-efficacy.

1.0 INTRODUCTION

Any organization, profit or nonprofit making, would seek to continuously ensure survival through positioning in the market. Higher learning institutions are not exempted. Learning from the successful companies of the world in "Built to Last" [6], it shows culture as one strong factor that cannot be neglected.

Malaysia has set its vision to be a high income nation by the year 2020. The next five years will be the final lap towards achieving this goal.

In the foreword of the 11th Malaysia Plan, set for the period of 2016 to 2020, launched by the Prime Minister of Malaysia, he emphasizes on the people productivity and innovation as its important pillars for the nation sustained economic growth into the year 2020 [7]. The role of innovation in survival and growth of organisation has been emphasized by researchers and practitioners [8]. As suggested by Van De Ven [9] innovations are ideas of the people, and it takes people to develop, carry out, modify these ideas and create them into new things. As the Prime Minister of Malaysia put it rightly, "anchoring growth on people". "A shift into knowledge and innovation based economy". [7, pp. 1-1]

The definition of economic growth of today's economy has also shifted into "jobs creation, lifting wages level and fostering long-term sustainable prosperity" [10]

As defined by Powell and Snellman [11] Knowledge Economy is "knowledge intensive economic activities that accelerates scientific and technological advances". "An economy with relies on intellectual capabilities and not so much of physical inputs". "A greater share of the nation's Gross Domestic Product (GDP) of these countries will come from intangible capital investment" [12]

Malaysian Economy

Every year, there are about 470,000 [13] school leavers in Malaysia seeking for employment. This is about 3.6% of the total 13.2 million [14] Labour force. Employability is becoming more challenging. Out of

these, 41,600 [15] will join the higher learning institution to earn their degree. Little wonder when there are close to 60,000 unemployed graduates in the country in 2013 [16]. Universities and higher learning institutions in the country have introduced various teaching approaches and pedagogy to prepare graduates to be more creative and innovative matching the new employability criteria set by the industry. [17], [18], [19], [20].

2.0 LITERATURE REVIEW

The factor of Culture that Influences Creativity

Amabile et al [2] define creativity as the "production of novel and useful ideas in any domain". Innovation on the other hand is defined as "the successful implementation of creative ideas within an organization". Creativity can be initiated by individuals as well as team, but not a guarantee for successful implementation, i.e. innovation [2]. A tool to assess the climate for creativity was introduced to help assess the work environment inventory supporting creativity and innovation. "KEYS" [2] was designed to assess all important (empirically proven) dimension of work environment for creativity in organization.

"KEYS" suggests 10 dimensions of work environment scales within three individual components of management practices, organizational motivation and resources [2].

Creativity can be learned

Various study were conducted and discovered that creativity can be learned, and the various approach of these study conclude the four area that influenced creativity [21], [22], [5], [23], [24], [25], [26].

As creativity can be learned, and enhancing creativity could happen over time through learning and skills development, it is believed that over time the creativity of the students in a higher learning institution will be influenced by the perceived climate [2] in the organization. (Hypothesis number 1)

Measuring individual creativity

Torrance Test of Creative Thinking is one of the most established instruments for measuring creativity in individual. This test assesses the individual person, the process involved (Divergent Thinking – Torrance Test of Creative Thinking. [3]). This study advocates that these creativity level indicated by the TTCT test will correlates to the perception scores in the “KEYS” profiling. (Hypothesis number 2)

As DT creativity test instruments are criticized for its low correlation ($r=0.06$) [27] and ($r=0.3$) [28], another instruments that may be used to validate level of creativity is based on the social cognitive theory. Ford [29] suggest that for individual to be creative, they must have an expectation about their ability to be successful.

Social cognitive theory shows how individuals are motivated by their perception of their capabilities to perform the task [30]. And these are driven by the individuals' self-efficacy. Self-efficacy is defined as the belief that reflects individual's confidence in their capabilities to perform innovation task [31], [32]. Bandura advocate perceived self-efficacy as “people's beliefs” in their “capabilities to produce” given performance [4]. Bandura suggest that perceived self-efficacy existed in a co-development environment. Perceived self-efficacy of different domain requiring different sub-skills, developed together in a highly promoting learning environment [33]. Bandura [33] also advocates that mastery experiences that prove individual's capacity can enhance their self-efficacy. In term of measures, self-efficacy can be accurately measured when it is domain specific [33]. The proposed instruments for measures, individuals are presented with situation for different levels of task demands. They are required to rate the strength of their belief in their ability to execute them [33].

Self-efficacy belief is suggested to be of influence to the motivation and ability of individual to act in a particular behaviour [34]. The study also advocates that high self-efficacy perception score would correlate to the higher score in the students' “KEYS” profiling. Hypothesis number 3)

3.0 EXPERIMENTAL

The Measure of Organisation Climate

There are a total of 121 teaching staff in the institution studied. To ensure anonymity, thus getting higher respond from the teaching staff, a web based survey will be conducted. Teaching staff will be invited to respond to questionnaires made available

in a website. These will be addressed to all the teaching staff via personal email. A three weeks period will be provided for this exercise. Guided by the “KEYS” dimensions, questionnaires were developed to relate these dimensions to the institution climates.

On the second climate profiling, as for the students survey, there are more than 2250 students in the institution. However there are only 896 of them attending the bachelor program, the focal point of this study. Therefore the total population of the study is 896 students. An approach of mixed method sampling [35] will be used. This will be a mixture of probability, purposive and convenience sampling method. As the study requires a good samples representing various semester that represent the student tenure in the organisation, a strategy is adapted to ensure such sample. Using random number for sample selection, it was identified that samples are to be taken from students' population in semester 2, 5 and 7.

The Measure of Potential Creativity

The same students surveyed on the organisation climate profiling were also asked to participate in the TTCT divergent test through exposing them to three problem situations for them to suggest solutioning ideas. These are collected and analysed in term of its quantity and categories as proposed by Torrance [3]. These students sampled for the survey were also, asked to rate their perceived confidents in addressing problems at the four stages of creative processes namely ideation, evaluation, implementation and analysis as suggested by Howard et al 2008 as cited by Basadur [36].

Additionally the students and teaching staff survey also asked the questions on pedagogical approached they used and exposed. This covers the perceived level of use on techniques like problem based learning, discovery learning etc.

4.0 RESULTS AND DISCUSSION

Pilot Test

These were conducted on samples of $n=71$ on all the surveys questionnaires. Questionnaires were subsequently revised in the freedom, challenging, impediments and workload dimensions to achieve Cronbach alpha close to 0.7, the acceptable threshold for reliability. The questionnaires stated above are taken as the best possible [37].

Responds Rate

The survey on the teaching staff attracted a total of 60 responds. However the total usable responds were determined as 47 (n=47) due to incompleteness and withdrawals from participation. This represents a responds rate of 38.8%.

On the students surveys, a total responds collected were 124. Nevertheless only 122 (n=122) are usable due to incompleteness or withdrawals. This represents a responds rate of 31.6%.

Teachers Perception of Organisation Climate

An analysis on the 47 teaching staff responded. (n=47), the standard deviations of these responses were aggregated into the ten "KEYS" dimensions to create a profile. Figure 1 presented the findings of this analysis. The standard deviation (SD) of the individuals' perception were aggregated to summarise these data.

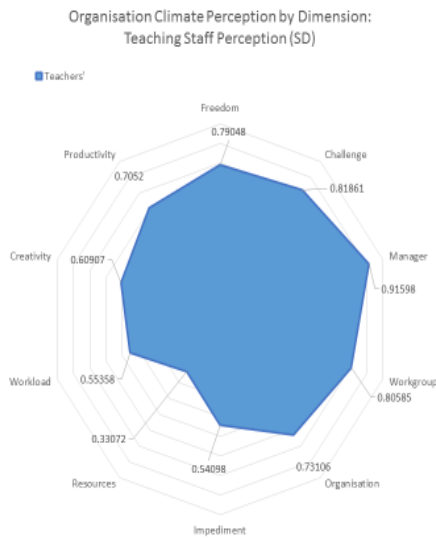


Fig. 1. Teacher's Perception on Organisation Climate.

Students' Perception of the Organisation Climate

Similar analysis were carried out on the students' perceptions data. The individuals' perceptions were aggregated covering various semesters sampled. This findings is shown in figure 2.

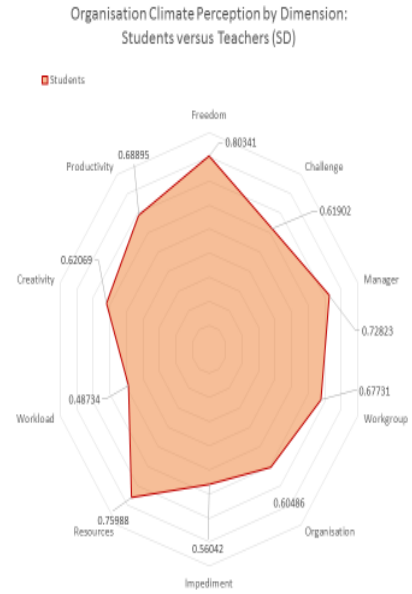


Fig. 2. Student's Perception of the organisation Climate.

Observation

From the above findings comparing the two profiles shows a very closely shaped profiles. This comparison is shown in figure 3.

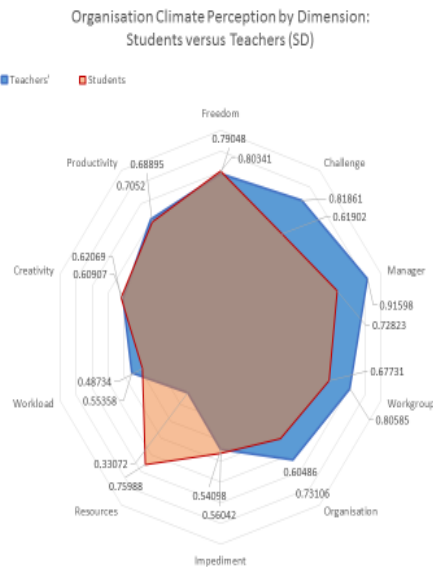


Fig. 3 Teacher's versus Student's Perception of Organisation Climate.

Hypothesis Number 1

The very closely match profile between teachers and students can conclude that teacher's climate perception do influence the student's perception. Further analysis of such profiles by students' semester validate this observation. (refer to figure 5)

Students' Creative Potential by Divergent Test

The creative potential of each students were assessed through identifying the quantity of solutioning ideas in each cases and number of different categories these ideas are from. The analysis is aggregated by their semesters. As the sampling were done on semester 2, 5 and 7 students only, the analysis are presented in the same manner. These are depicted in the figure 4.

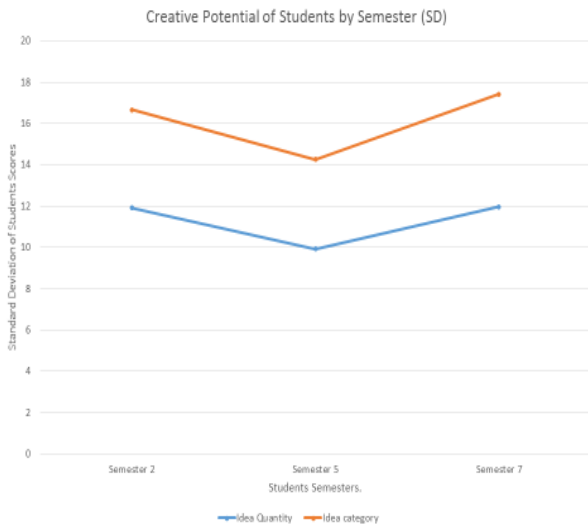


Fig. 4. Students' Creative Potential, Fluency and Flexibility, by their Semester.

This aggregation using the standard deviation shows that the students' creative potential increases following their semester. This findings are further validated by the observed profiles of the students' climate perception by their semester as shown in figure 5.

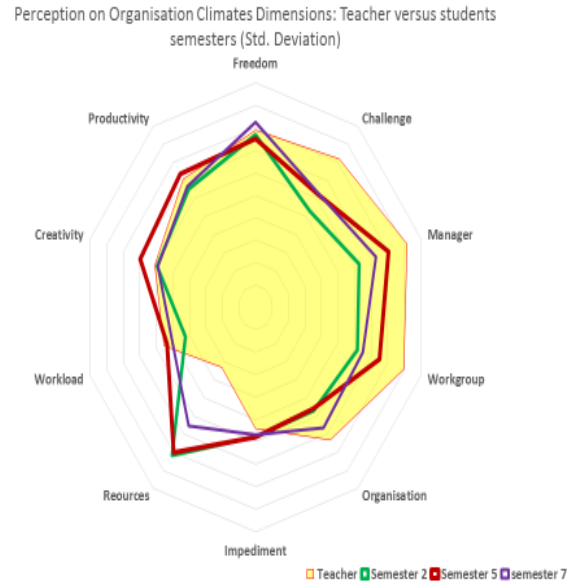


Fig. 5. Students' Climate Perception by Semester.

The two observations above correlates the conclusion of higher creative potential to the climate perception by their semester. This validate the study hypothesis number 2. Further validation were also observed from the creative self-efficacy perception scores of the students. Figure 6 summarises these observations. These observation supported the proposed hypothesis number 3.

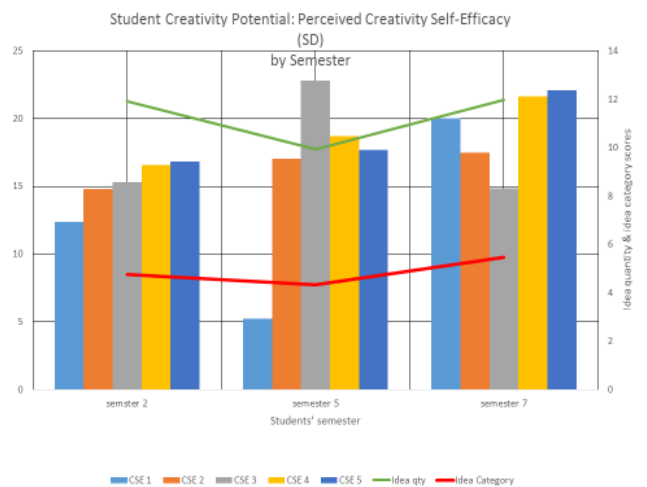


Fig. 6. Students' Creative Potential versus creative self-efficacy score by their Semester.

For further validation of these three hypothesis, deeper analysis were conducted to verify how climate dimensions' scores relates to the creative self-efficacy perception and creative potential fluency and flexibility scores. The climate perception

on freedom dimension score for example, shows higher score consistently support higher creative self-efficacy scores in all five situations. This is shown in figure 7.

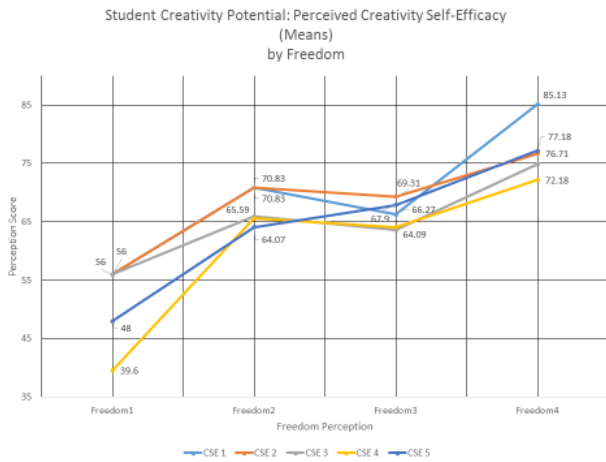


Fig. 7. Students' Climate in Freedom Dimension Perception Scores versus Self-efficacy scores.

Similar observations are recorded on the climate freedom dimension, whereby higher perception scores consistently supports higher creative potential scores. Figure 8 depicted these findings.

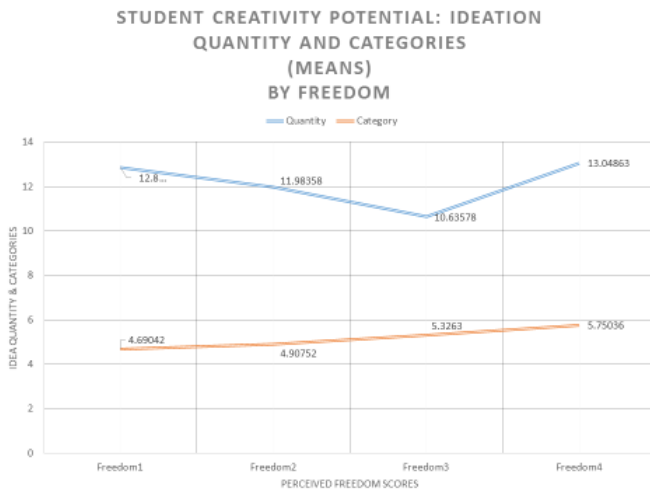


Fig. 8. Students' Climate Freedom Dimension Perception versus Creative Potential Scores.

5.0 CONCLUSION

The Observations Concluded

The observations without reasonable doubt supported the study hypothesis. The organisation creative support dimensions of the institution's

students were shown to be closely influenced by their teachers' perception in aggregation as well as by their semester. (Hypothesis number 1). This were followed by the influences of these climate perceptions on these students' creative potential scores in both fluency as well as flexibility. (Hypothesis number 2). The same observation on the creative self-efficacy perception scores validate further the influences of climate perception on the students' potential creativity. (Hypothesis number 3).

The above findings were further validated by the observations on how each individual climate dimensions scores influenced the creative self-efficacy and creative potential. For the higher learning institutions it is now important for them to determine how higher perception of innovative supporting climate among the teaching staff can be effectively instilled.

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