In recent years there has been a tremendous upsurge of interest in using teams in organisations which is encouraged by the common belief that team performance is more effective than individual performance. One significant trend of researches in this field is that the science of teams and teamwork is increasingly incorporating emerging notions from cognitive psychology (Salas, Stagl, and Burke, 2003: 12), among which cognitive style is one that attracts major attention.

Cognitive style is defined as a person’s preferred way of gathering, processing and evaluating information. It influences how people scan their environment for information, how they organise and interpret this information, and how they integrate their interpretations into the mental model and subjective theories that guide their actions (Hayes and Allinson 1998: 850). Although there have long been debates and discussions about the complex or unitarist nature of cognitive style and various divisions of cognitive style dimensions, most academics (Messick, 1976; Miller, 1987; Kogan, 1983; Rayner and Riding, 1997 quoted in Armstrong, 2000: 325, Allinson, et al. 2001: 203; Riding and Sadler-Smith, 1992, quoted in Allinson and Hayes, 2002: 1113) claim that these divisions are merely different conceptions of a superordinate dimension, the poles of which are commonly ‘analytic’ and ‘intuitive’ (Allinson and Hayes, 1996).

On this basis, Riding and Douglas (1993) define a principal cognitive style group comprised of the dimensions labelled as the Wholist- Analytic cognitive style. These poles are also commonly labelled Intuitive- Analytic (Agor, 1986; Allinson and Hayes, 1996; Doktor, 1978; Hammond 1987; Zeleny, 1975, quoted in Armstrong, 2000: 203). In the work context, an analytic person would tend to be compliant, prefer a structured approach to decision making, apply systematic methods of investigation and be especially comfortable when handling problems requiring a step-by-step solution. An intuitive individual, on the other hand, would tend to be relatively non-conformist, prefer a rapid, open-minded approach to decision making, rely on random methods of exploration and work best on problems favouring a holistic approach (Lynch, 1986, quoted in Allinson, et al. 2001: 204).
The implication of cognitive style as an important aspect of individual differences has been widely recognised. Messick (1976, quoted in Armstrong et al., 2002:1113) suggests that its influence extends to almost all human activities that implicate cognition, including social and interpersonal functioning. In this concern, teamwork requires that members interact by exchanging information, sharing resources, and coordinating with and reacting to one another in the cause of accomplishing the group task. Furthermore there is always some degree of independence within the members of a team as well as interdependence among different teams in an organisation (Muchinsky 2003: 281). These aspects, which require and reflect the teamwork skill competencies of team members, are all closely related to cognitive style.

A study on the relationship between individual cognitive style and teamwork skill competencies acquisition would have important implications for understanding the performance of individuals in teamwork setting and providing a basis of further improving the overall team performance in terms of selection, placement and training of team members. Based on this idea, a study, with an aim to find out the effect of the analytic-intuitive dimension of cognitive style on the individual acquisition of teamwork skill competencies, was carried out among 100 students from Leeds University.

Cognitive style was assessed using the Cognitive Style Index (CSI) (Allinson and Hayes, 1996), an inventory of 38 items scored on a 3-point scale of true-uncertain-false to measure the intuitive-analytic dimension of cognitive style. Score of 2, 1, or 0 are assigned to each response, the direction of scoring depending upon the polarity of the item (17 are reversed to control for acquiescence response bias). CSI items are derived from 18 different conceptions of cognitive style identified in the literature (Hayes and Allinson, 1994; Hayes and Allinson, 1998). A score towards the maximum of 76 indicates a relatively analytic style, and a score towards the minimum of zero indicates a relatively intuitive style. The scale is primarily intended for use with managerial and professional samples though it has been administered successfully to students and non-managerial groups (Maltby, Lewis, and Hill, 2000:169).
The teamwork skills competencies variables were measured using self-developed 6-point Likert-type scales that are labelled in the order as ‘strongly disagree’, ‘disagree’, ‘slightly disagree’, ‘slightly agree’, ‘agree’ to ‘strongly agree’. Teamwork skills are measured in eight aspects proposed by Salas, Cannon-Bowers and colleagues (Cannon-Bowers et al. 1995, Salas, Burke, and Cannon-Bowers, 2000): adaptability, shared situational awareness, performance monitoring/back-up behaviour, team leadership, interpersonal relations, coordination, communication and decision making. To obtain a more accurate assessment of these variables, the eight variables are measured respectively by 3-10 variables that match the subskills of the eight aspects of teamwork skills adopted from the summary by Salas et al. (2000):

- **Adaptability**: capacity for closure, development to innovation, mutual adjustment, dynamic reallocation of function, asking for assistance.

- **Shared situational awareness**: common situational awareness, shared problem model development, and team awareness.

- **Performance monitoring and feedback**: performance feedback, giving suggestion, error correction, giving criticism, acceptance of criticism, acceptance of suggestion, cross checking, planning review, and intra-team performance monitoring.

- **Team leadership**: task assignment, resource distribution, resource management, performance direction, establishment of task priorities, mission analysis, drive to completion, and goal orientation.

- **Interpersonal relations**: conflict solution, boundary spanning, morale building, cooperation, assertiveness.

- **Coordination**: timing and activity pacing, task integration, and technical coordination.

- **Communication**: effective influence, open exchange of information, and evaluative exchange.

- **Decision making**: information processing, information evaluating, and use of information.

It is hypothesised that individuals differing in cognitive style will excel in different aspects of teamwork skill competencies.

**Hypothesis 1. Adaptability**

The more an individual tends to be intuitive than analytic, the higher the competency of adaptability the individual demonstrates in the teamwork setting.
Hypothesis 2. Shared situational awareness
The more the individual tends to be intuitive than analytic, the higher the competency of shared situational awareness the individual demonstrates in the teamwork setting.

Hypothesis 3. Performance monitoring and feedback
The more the individual tends to be analytic than intuitive, the higher the competency of performance monitoring the individual demonstrates in the teamwork setting.

Hypothesis 4. Team leadership
The more the individual tends to be intuitive than analytic, the higher the competency of team leadership the individual demonstrates in the teamwork setting.

Hypothesis 5. Interpersonal relations
The more the individual tends to be intuitive than analytic, the higher the competency of handling interpersonal relations the individual demonstrates in the teamwork setting.

Hypothesis 6. Coordination
The more the individual tends to be more intuitive than analytic, the higher the competency of coordination the individual demonstrates in the teamwork setting.

Hypothesis 7. Communication
The more the individual tends to be intuitive than analytic, the higher the competency of communication the individual demonstrates in the teamwork setting.

Hypothesis 8. Decision making
The more individual tends to be analytic than intuitive, the higher the competency of decision making the individual demonstrates in the teamwork setting.

100 questionnaires were distributed with 43 returned, a response rate of 43%. The respondents cover a range of students aged between 20 and 49 from 11 countries and 14 programmes. The questionnaire data, after being coded, were statistically analysed by the SPSS. Descriptive statistics is used to examine the central tendency and dispersion of the data. Independent t-tests are performed to compare the mean values of two different demographic groups divided according to gender (male/female), programme of studies (science/arts), nationality (eastern/western), experiences of academic teamwork (more/less), and experiences of organisational teamwork (more/less or no). Pearson’s product moment correlation coefficient tests are carried out to assess
the strength of relationships between cognitive style and eight aspects of teamwork skill competencies (Saunders et al. 2003: 352, 357). Taking into consideration the limitations of the research design and research process, the findings should be dealt with adequate caution.

The findings do not support the proposition that there are relationships between Cognitive Style variance and acquisitions of teamwork skill competencies except coordination competencies. The statistical evidence shows that there is a weak negative relationship between Cognitive Style Index score and the competencies to coordinate in the teamwork setting. The less score an individual gets from the Cognitive Style Index, which means that the individual tends to be more intuitive than to be analytic, the better the individual coordinates with other team members in teamwork. It demonstrates that an intuitive individual tends to have better coordination competencies than an analytic individual in teamwork setting. This finding is in line with and can be explained by the previous research findings that an intuitive individual tends to be more field dependent, put more emphasis on synthesis and be capable of the simultaneous integration of many inputs at the same time (Allinson and Hayes, 1996). However, since a Pearson’s product moment correlation coefficient test can only assess the strength of relationship between pairs of variables (Saunders, Lewis and Thornhill, 2003:357), other relevant statistical analysis is necessary to be carried out to prove that there is a causal relationship between the intuitive-analytic dimension of Cognitive Style and individual coordination competency.

Though the other seven hypotheses are not supported by the statistical results, it is still noteworthy that, except that the rather weak positive relationship found between cognitive style index score and communication competencies is opposite to the hypothesised negative relationship, the statistical analyses demonstrate that the other teamwork skill competencies are correlated with cognitive style scores in the predicted directions of correlations as assumed in the hypotheses. The lack of statistical significance of the relationships may result from the small size of sample (Saunders et al. 2003: 357). The inconsistency of the statistical results and the hypothesised relationship between the Cognitive Style Index score might be caused by the inaccurate measurement of the variable communication which is assessed by three sub-variables: effective influence, open exchange of information and evaluative information exchange. The active evaluative information exchange can
involve preference of relatively frequent reflection of thoughts which can be a typical characteristic of an analytic (Hayes and Allinson, 1994:58-59). Further similar researches carried out in a larger sample with more accurate measures of the teamwork skill competencies should be able to yield much more encouraging results about the relationships between the intuitive-analytic dimension of cognitive style and the teamwork skill competencies.

The median cognitive style index score of the sample is 42, very close to the threshold score 43 to divide the intuitive and analytic groups which is the median for a large sample from the general work population. This again proves the consistency of the psychometric instrument Cognitive Style Index.

Though no statistical significance found in cognitive style index score between these demographic groups due to the small size of sample, comparisons of the mean Cognitive Style Index score between groups divided by gender, programmes of study, and nationality show that female respondents tend to be more intuitive (M= 41.32) than male respondents (M= 42.42), respondents in science departments tend to be more intuitive (M= 41.59) than respondents in arts departments (M= 42.06), respondents from eastern countries tend to be more intuitive (M= 40.07) than respondents from western countries (M = 44). These findings are not consistent with previous researching findings that female are generally more analytic than male (Allinson and Hayes, 1996). The difference of mean cognitive style index scores between the gender groups are not large, therefore the inconsistency might be a result of the small size of the sample. The findings are not in line with the general perception that science students tend to be more analytic than arts students, which may be caused by the effect of the much larger number of arts students (31) than science students (12) in the sample. The comparison of the cognitive style index scores between the nationality groups is in consistency with the proposition of Redding (1980, quoted in Allinson and Hayes, 2000: 162) that international differences in cognitive style can be seen in terms of an East-West dichotomy. According to Redding, Western thinking tends to be analytical with a focus on the sequential links between cause and effect whereas the Eastern approach is inclined towards an intuitive examination of the whole universe of the events as a system of interdependent part. Nevertheless, according to the review and the relevant research on the East-West dichotomy of
cognitive style difference by Allinson and Hayes (2000), empirical evidence of cultural differences in cognitive style is mixed. The obvious difference between the mean cognitive style index score between the nationality groups, though the statistical significance is not found probably due to the small size of the sample, implies that further research on the national cultural influence on cognitive style should be fruitful. Caution is needed when using this finding, taking into consideration the limitations of the present study in terms of methodological issues.

Interdependent t-tests are also performed to compare the mean teamwork skill competencies between groups divided by degree of teamwork in programmes of study, and organisational teamwork experience with the assumption that teamwork experience gained from academic study and organisational work may influence the teamwork skill competencies of individuals. The mean teamwork skill competencies of students with more academic teamwork are all greater than those of students with less academic teamwork. Though no statistical significance is found in the mean teamwork skill competencies of the groups, the statistics demonstrates that students with more teamwork in their programmes of study tend to acquire better teamwork skill competencies in all the eight aspects than students with less academic teamwork. This finding confirms that there will be moderating effect of degree of academic teamwork on the relationship between cognitive style index score and teamwork skill competencies. Moreover, this finding holds implications for further research on the effect of teamwork training by academic teamwork practices on improvement of teamwork skill competencies. Again, cautions should be given when using this finding due to the methodological weaknesses of the present study. The comparisons of the mean teamwork skill competencies between groups with organisational teamwork experience and without organisational teamwork experience do not produce consistent differences. The assumption that students with organisational teamwork experience might have better teamwork skill competencies than students without organisational teamwork experience is not confirmed. This may be caused by the sample limitation, however, the inconsistent difference of the results calls for attention in future research design on teamwork training in organisations.

These findings suggest important implications for management practice. A good understanding of the effect of cognitive style on teamwork skill competencies will help improve team performance management by monitoring the selection, placement and training of teams. Placing team members
of specific cognitive style with regards to the cognitive requirements of tasks will greatly improve team performance. Knowledge in this aspect will also help improve conflict management among and between teams.

The present study is a compromise of the author’s original research idea. The original research idea is to explore if there are similar relationships like those between cognitive style and individual behaviour existing between the overall cognitive style of a team or the ‘cognitive climate’ within a team as proposed by Kirton and McCarthy (Hayes and Allinson, 1998: 858) and team performance. Kirton and McCarthy suggest that there is something which can be described as a ‘cognitive climate’ which is made up of the collective preferred styles of the group’s majority clustered around its mode or mean (Hayes and Allinson 1998: 858). Though there have been abundant researches on the shared cognition in organisations, the existing literature has not presented a measure about the cognitive aspect of a team. The research is also an exploratory study to find out a measure for ‘cognitive climate’ within teams. With a notice that most team studies are carried out in laboratory setting, the research is planned to carry out within the marketing students in Leeds University Business School who have been divided into study groups and working as groups for all the modules throughout the whole programme, which offers a valuable opportunity of studying teams in naturalistic settings. However, due the unavailability of the research conditions, this research idea has to be given up and is reduced to explore the relationships between cognitive style and individual acquisition of teamwork skill competencies. Though the present study is also interesting, the author believes that the research findings will be more fruitful and enlightening if the original research idea can be turned into a real research project.

The main contribution of this investigation has been to provide a small-scale preliminary study on the relationship between cognitive style and teamwork skill competencies that is surprisingly ignored by previous researches. Though most hypotheses are not confirmed, the findings still suggest the possibility of much more encouraging results from a large –scale study carried out with a more appropriate research design.
References


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