

Effects of motivational psychology characteristics factors on teachers' classroom action research performance

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Abstract

The purposes of this study were 1) to validate the developed Classroom Action Research Performance Model (the CARP Model), in which motivational psychology characteristics (MPC) factors as predictors of teachers' classroom action research performance (CARP), 2) to investigate effects among MPC, and their effect on CARP, and 3) to investigate the level of MPC and CARP of teachers. The participants were 678 teachers in 37 RDL project schools selected by stratified random sampling method.

The results revealed that: 1) the validation of CARP model was supported by empirical data, 2) personal agency belief has the highest effect on goal commitment, which in turn affects mental effort, but had no effects on CAR performance, and 3) teachers' MPC were high but CAR performances were moderate.

Keywords: Motivational Psychological Characteristics (MPC), CANE Model, Classroom Action research Performance Model (CARP Model), Structural Equation Model

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Introduction

The National Education Act 1999 Section 4, item number 25, stated that teachers should be promoted and enhanced to conduct classroom action research (CAR) in order to facilitate and provide learner-centered learning. However, teachers in Thailand, teachers complained bitterly that conducting CAR increased their burdens, and they also lacked motivation and knowledge to conduct CAR. In the Research and Development of The Whole School Learning Reform Project (RDL Project), sponsored by the Thai Research Fund (TRF) Commission, headed by Khemmani (see Khemmani, et al., 2004), CAR was employed as a strategy for the whole school reform at the classroom level. In this situation, all the teachers were motivated to conduct CAR.

CAR is one of the activities that should be launched in a classroom setting because it helps teachers to plan a particular teaching, select useful teaching practices, talk about teaching with colleagues, engage in intellectual pursuits and become continuous learners, help students to learn and improve their teaching behaviors, while creating new forms of professional development and new forms of research and constructing knowledge (Madison Metropolitan School District, 2001). Many sources, viz. Kemmis (1988), Madison Metropolitan School District (2001), Mettetal (2001; 2004), Miller (2001), Ithaca city school district (2003), Wiratchai (2003), and Wongwanich (2003) indicated that classroom action research was an important tool for teachers to improve their students in both learning achievement and desirable characteristics. Motivating teachers to conduct CAR is, therefore, the most important function of the administrators.

Among motivational theories, the “Commitment And Necessary Effort model” (the CANE model), developed by Clark (1999), is a very interesting perspective, as it is so different from other motivational theories by the integration of Ford’s Motivational System Theory: MST (Ford, 1992) and three other research perspectives, proposed by Solomon (1984), Pintrich & Schunk (1996), and Bandura (1997)

Clark (1999) proposed the CANE Model; a two stage model displaying the linkage between two major motivational psychological characteristic (MPC) factors: goal commitment, and mental effort, which seem to be the main motivational issues in most work settings. In the first stage, goal commitment occurred. The second stage, goal commitment, pursuit of a goal which led to decisions about the quality and quantity of mental effort invested.

Goal commitment predicted by multiplicative relationship among three factors: task value, emotion, and personal agency belief. Whereas, mental effort, amount of necessary effort required achieving work goal, was influenced by self-efficacy and goal commitment. The relationship among these factors can be displayed in equation form and by Figure 1 (Appendix), as follows:

$$\begin{aligned} \text{goal commitment} &= \text{task value} \times \text{emotion} \times \text{personal agency} \\ \text{mental effort} &= \text{goal commitment} + \text{self-efficacy} \end{aligned}$$

In the CANE Model, mental effort was the final dependent variable. Pintrich and Schunk (1996) suggested that the CANE Model could be extended to explain variations in achievement and performance of individuals.

There are some research studies relating to the CANE model. Hedrick (2001) investigated the correlation between motivational variables of the CANE model and achievement of 490 newly enrolled students in algebra classes both in a middle school or a high school. The results showed no significant correlation between motivation and performance on the new mathematics problem. Shore (2002) investigated motivation and

persistence to exercise, using the CANE model of motivation as a platform. The sample was consisted of 309 individuals ranging in age from 18 to 101 years old. This study found that self-efficacy, emotion, and task value were contributors to persistence in exercise. Reynolds (2003) investigated the cause of mathematics anxiety through examining the role that the condition plays in mathematical motivation, specifically, in the CANE model of motivation. The analysis revealed that mathematics anxiety was a stronger predictor of mathematical persistence than either mathematical self-efficacy or mathematics task value. Further, neither low mathematical self-efficacy nor low mathematics task value appears to cause mathematics anxiety.

In this study, the present author attempted to find out whether the MPC factors in the CANE model was able to influence the CAR performance.

As stated, The CANE Model consisted of two major MPC factors: goal commitment and mental effort, which was composed of four minor factors: task value, emotion, personal agency belief, and self-efficacy, were used as the predictors of CAR performance. Then, the Classroom Action Research Performance Model (the CARP Model) was developed from the CANE model by adding two dimensions of CAR performance: CAR achievement, and CAR product, as the dependent variables affected by the CANE model. Therefore, the developed CARP model consisted of five factors and 14 indicators from the CANE model, and two factors with three indicators of CAR performance with definition and relationship among those factors in the CARP model as shown in Figure 2 (Appendix), were as follows:

Goal commitment (GC) referred to persistence or time spent on tasks, pursuit of work goal over time in face of distraction, and could be measured by two indicators: *persistence (PES)*, and *struggle (STR)*. Goal commitment was influenced by task value, emotion, and personal agency belief. (Clark, 1999; Condly, 1999)

Task value (TV) referred to a belief of individuals, concerning “important to”, “interested in”, and “utility of” tasks, could be measured by three indicators: *Important to (T_IMP)*, was defined as the significance to a person of doing well on a task, *Interest in (T_INT)*, was defined as the enjoyment or intrinsic curiosity people experience when performing tasks, and *Utilities for (T_UTI)*, was defined as the usefulness of the task for individuals in terms of their future goal. (Eccles and Wigfield, 1995; Pintrich and Schunk, 1996; Clark, 1999; Condly, 1999)

Emotion (EMO) referred to subjective feelings which dictated behaviors. Emotion could be measured by two indicators: *positive emotions (EMO_P)* and *negative emotions (EMO_N)*. Positive emotions fostered goal commitment, but negative emotions inhibited goal commitment (Ford, 1992; Boeakert, 1993; Spering, Wagerner, & Funke, 2003)

Personal agency beliefs (PAB), could be measured by two minor factors: (1) *self-efficacy (SE)*, defined as a belief that one had the necessary skills to attain a goal, measured by confidence to achieve a work goal, measured by two indicators: general self-efficacy and specific self-efficacy, and (2) *context belief (CTB)*, defined as the circumstances surrounding a work goal, measured by three indicators: *belief in persons (PER)*, *belief in facilities (FAC)*, and *belief in situations (SIT)*. (Ford, 1992; Clark, 1999)

Mental effort (ME) was defined as a conscious, non-automatic cognitive strategy to facilitate goal achievement. When goals were chosen and actively pursued, decisions about the types of knowledge were required to achieve the goal. Mental effort was influenced by goal commitment (Clark, 1999) and self-efficacy (Solomon, 1984; Bandura, 1997). Mental effort could be measured by two indicators: *deliberately*, and *concentration on a work goal*.

In this study, CAR performance, was studied in two aspects: CAR achievement (CAR_ACH) and CAR product (CAR_PRO). CAR achievement was measured by the teachers' *CAR knowledge, ability, and methodology*. CAR Product was measured by the teachers' *quality of CAR report and value of CAR*.

The purposes of this study

1. to examine the validity of the developed Classroom Action Research Performance Model (the CARP Model) derived from the CANE Model
2. to investigate effects among factors in the CARP model.
2. to investigate the level of teachers' motivational psychological characteristics (MPC): goal commitment, mental effort, task value, emotion, and personal agency belief, and classroom action research performance (CARP): classroom action research achievement and classroom action research product of teachers in the RDL project.

METHODS

Participants

The 678 samples were drawn from 5,747 teachers in 37 of 135 schools of RDL project by stratified random sampling. Most of them were female (82.15%), not more than 20 years of service (92.63%), some of them (28.24%) worked as head master, vice head master, chief of grade level, most of them had bachelors degree or lower (78.47%). Half of them were 40 years old and younger (50.15%), the other half was 41 years old and over (49.85%), equally from each four geographical regions, and each six jurisdictions. See Table 1 in the appendix.

Sample size was estimated by ten times of the number of parameter in developed CARP model, as suggested by Hair et al (1998) and Wirattchai (1999) that in analyzing the influence among latent variables at least five samples should be employed for each parameter; however for the robust statistical analysis, ten samples should be employed. In this research the author used 678 samples of the 23 parameters, which is the number that much over the minimum requirement.

Data and Instruments

The data for this study were grouped into 5 sets, and were collected by different research instruments as follows:

Set 1, *Motivational Psychological Characteristics (MPC)*: goal commitment, mental effort, task value, emotion, personal agency belief, context belief, and self-efficacy, were collected by five scales Likert type questionnaire, adapting from the existing instruments of Eccles and Wigfield (1995), Solomon (1984), Klien et al (2001), Miller et al (1996), Condly (1999), Corey (2003), Lumpe, Haney, and Czemaik (2000), translated into Thai language, and were developed for this research with Cronbach's Alpha reliabilities 0.069, 0.852, 0.891, 0.865, 0.903, 0.901, and 0.745 respectively.

Set 2, *Background variables*: gender, year of service, position, age, teachers' educational level, geographical region, and jurisdiction, were collected together with the first set of data by checklist form.

Set 3, *CAR achievement*, measured from knowledge and ability in CAR methodology collected by using a multiple choice test, partial credit scoring, developed by the authors, with Cronbach's Alpha reliabilities 0.702, discrimination power was 0.267, and level difficulty were 0.212 - 0.603

Set 4, *CAR product*: *CAR quality* obtained by assessing teachers' CAR reports by employed five level scoring rubrics, developed by the author with inter-rater correlation 0.881. *CAR value*, obtained by evaluating the benefit of CAR contributing to students,

teachers who conducted CAR, teachers' colleagues, and new knowledge attained from CAR, checklist form, designed by the author, with inter-rater correlation 0.905.

All of the instruments were assessed for content validity by nine specialists in the field of education, psychology, and measurement and evaluation. The item - objective congruency index (IOC) of each item were range from 0.8 - 1.0. In addition, the instrument for data set 1 was tested for construct validity by the second order confirmatory factor analysis technique, as shown by Figure 3 (3.1- 3.5).

Procedure

Questionnaires for data set one, two, and three were mailed to the teachers in RDL schools across four regions of Thailand at least two weeks before the authors went to collect them back together with their complete CAR reports. The data set four attained by reading 777 CAR reports, and give score by the five level scoring rubrics and checklist form as mentioned in data set 4.

The data were analyzed for: (a) The CARP model validation and effect among MPC, and their effects on CARP, was analyzed by structural equation modeling using the Lisrel program version 8.52 (b) mean of MPC and CARP by mean, and standard deviation, and then interpreted mean into level of MPC and CARP by this criteria: 1.00 – 1.49 = very low, 1.50 – 2.49 = low, 2.50 – 3.49 = moderate, 3.500 – 4.49 = high, and 4.50 and over = very high (Best, 1983),

RESULTS

Validity of the CARP Model and Effects Within it

The CARP Model fit nicely with the empirical data (see Figure 2). It means that the proposed CARP model was validity developed suit the situation occurring in the context of the RDL project schools. Thus, it could explain how to motivate the teachers in the RDL project to create CAR performance relevant to the real situation of conducting CAR in RDL schools. There were effects statistically significance among mean as follow: emotion, and personal agency belief on goal commitment (0.447 and 0.467 respectively), and goal commitment on mental effort (0.810), no significant effect on CAR achievement and CAR product.

The Level of MPC and CARP

MPC: As a whole, teachers have high MPC: Teachers tried hard to doing well on CAR, highly enjoyment or intrinsic curiosity people experience when performing CAR, and perceive that CAR have high usefulness on their teaching career, indicated by high task value ($M = 4.037$), have medium subjective feelings which dictated behaviors to do CAR, indicated by moderate emotion ($M = 3.470$). have moderate belief that they have necessary skills to attain CAR and moderately believe that the circumstances surrounding doing CAR can facilitate them, indicated by moderate personal agency belief ($M = 3.262$), persistence and spend much time on CAR, pursuit of CAR over time in face of distraction, indicated by high goal commitment ($M = 3.184$), and use much conscious, not-automatic cognitive strategy to facilitate CAR, actively pursue CAR, indicated by high mental effort ($M = 3.786$).

CARP: the achievement in CAR, and the CAR product they have done are moderate ($M = 2.735$, and 3.130). (see Table 2, Appendix)

Discussion

The CARP model fits nicely to empirical data and effects among factors in it. These results respond to theories/perspectives which were employed to develop the CARP model: CANE model of Clark (1999), Printich and Schunk (1996), and Solomon (1984). However, there are two path effects of the original CANE model has no statistical significance: task value on goal commitment, and self-efficacy on mental effort. Focusing on the extension part, found that mental effort and goal commitment has no effect on teachers' CAR achievement, CAR quality, and CAR value. This result is relevant to the finding of Hedrick (2001) that there is no significant correlation between motivation and performance on the new mathematics problem, and of Reynolds (2003), that mathematic persistence (goal commitment) got less effect from mathematic task value than mathematics anxiety, but partly relevant to the finding of Shore (2002) that emotion and task value are contributors to persistence in exercise

The moderate level of CARP which were found in this research are relevant to the prior finding of Suhlong (2002) that CAR quality of teachers under the jurisdiction of Bangkok metropolitan were moderate. This finding reveals that teachers in RDL project schools still need more knowledge concerning CAR.

Implications

The finding of this study leads to the implication for developing the CARP model, the implication for further research, and the implication for education policy, as follows:.

There are three strategies for further developing the CARP model. *Firstly*, the CARP model was developed underlying the CANE model (Clark, 1999). Therefore, this research framework was developed based on the CANE model. Even though, it is relevant to the empirical data, it could be further developed by adding direct effects from these the following factors: task value, emotion, and personal agency believe to these three factors: CAR achievement, CAR product, and mental effort. Then, the CARP model will demonstrate both direct and indirect effects among these factors completely. However, supported literature should be reviewed for these path direct effects. Further more it could add non-recursive effect between CAR achievement and CAR product, because, in general, ones who have more knowledge could do better work one hand. On the other hand, ones who have done better work would earn more knowledge. In addition, three correlation paths could be added among task value, emotion, and personal agency belief, because results of the data analysis show that coefficient correlations among these variables are very high (0.728, 0.769, and 0.815). *Lastly*, adding any kind of RDL project's treatment/activities which were provided to schools/or teachers in RDL project that could affected the goal commitment, mental effort, CAR achievement and CAR product.

Further research should be launched *firstly*, by using control group design to compare the results of the treatment of RDL projects to the MPC and CARP to other schools outside the RDL project; *secondly*, studying the effects of treatment of the RDL project to all variables in CARP model for clearly identifying the effects influencing CARP, *thirdly*, employing qualitative methodology for studying organization culture of teachers/school in the RDL project. *Fourthly*, reduce some items in CAR achievement test, because, the present author found that many of the teachers did not finish the tests completely. *Finally*, develop a new model of learning or working, using the CANE model as the predictor of another type of performance dependent variable instead of knowledge, quality or value. This is because this study found that goal commitment and mental effort do not contribute to these CARP variables. The previous studies of Hedrick (2001), Shore (2002) and Reynolds (2003) found

that in different circumstances the effects of variables in the CANE model affect the dependent variables differently. Therefore, testing for the appropriate phenomena for the perspective of the CANE Model should be further explored.

The implications for education policy are: (a) no matter how useful it is, classroom action research is not a new issue in education, many teachers in Thailand have been trained to conduct CAR; including teachers in the RDL project, but the finding of this study reveal that CAR achievement, CAR quality, and CAR value of teachers in the RDL project are moderate. So, empowering teachers to conduct CAR should be done, (b) use CAR as a criterion for improving teacher's academic position, or salary, (c) provide any strategies for increasing teachers' MPC, emphasizing personal agency beliefs to conduct CAR, (d) motivating to conduct CAR is a very hard thing to do, but this study clearly shows that teachers in RDL schools have high MPC; these results show that the RDL project is able to motivate teachers to conduct CAR. Therefore, support to further implement the RDL project, or promote new projects similar to the RDL project should be offered.

One limitation of this study was the method of measuring CAR achievement using the test of knowledge and ability to conduct CAR, as stated before, the CAR achievement test was mailed to teachers across Thailand together with questionnaires for MPC. Therefore, the test taking time by each teacher was different; this may cause unreliability to the score. The data collection could be improved if first administration is more controlled by giving it in one setting with specified time across the board.

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APPENDIX

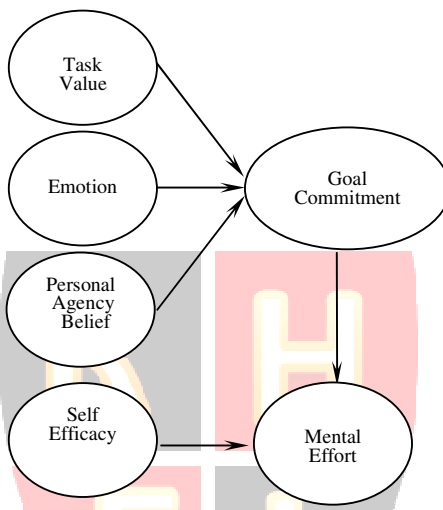


Figure 1. Clark's CANE Model (Clark, 1999).

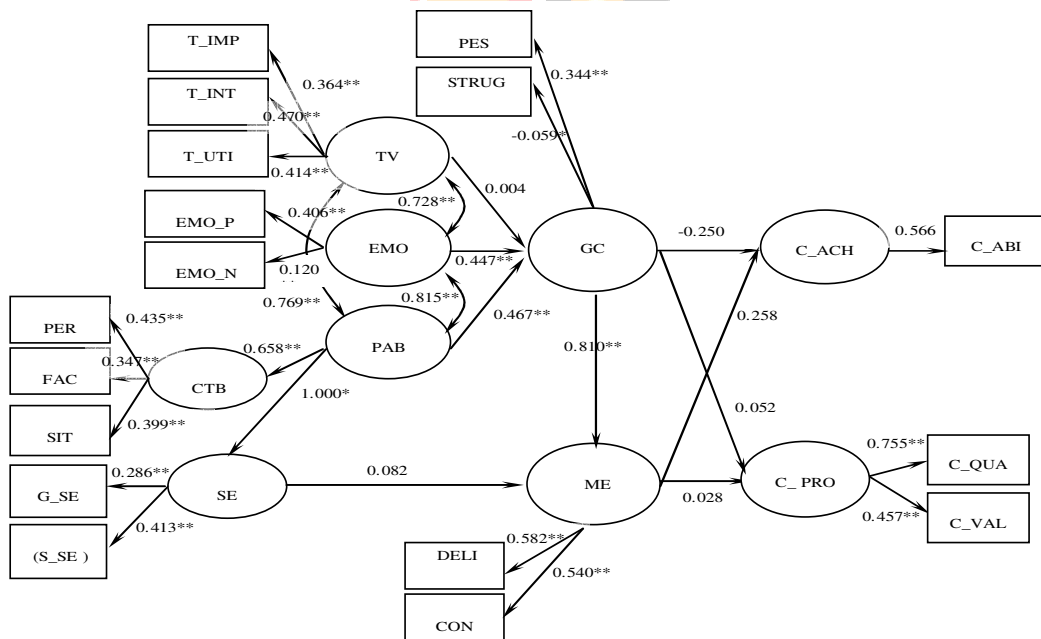


Figure 2. Effects in the CARP Model.

$\chi^2 = 67.232$, $df = 52$, $P = 0.076$, $RMSEA = 0.000$, $GFI = 0.988$, $AGFI = 0.966$

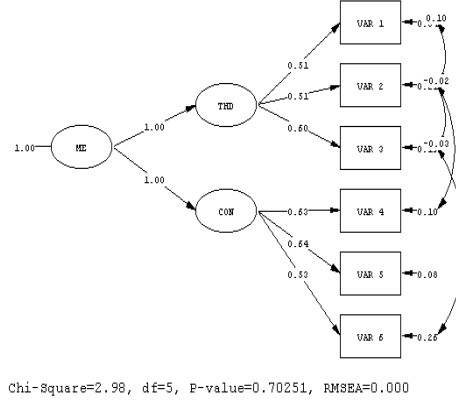
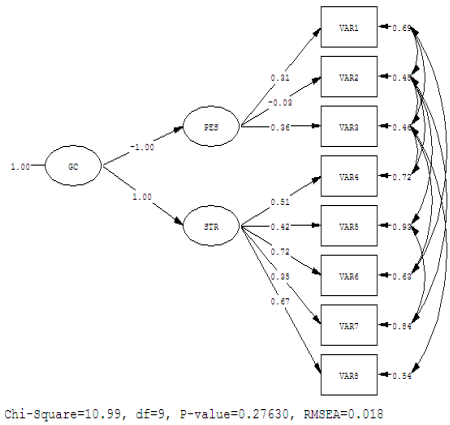


Figure 3.1. Goal Commitment

Figure 3.2. Mental effort

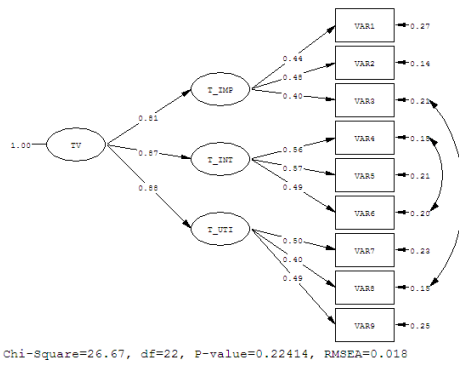


Figure 3.3. Task value

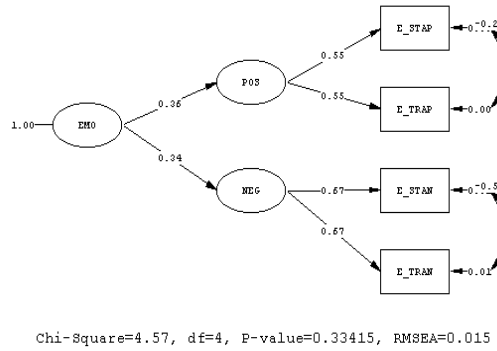


Figure 3.4. Emotion

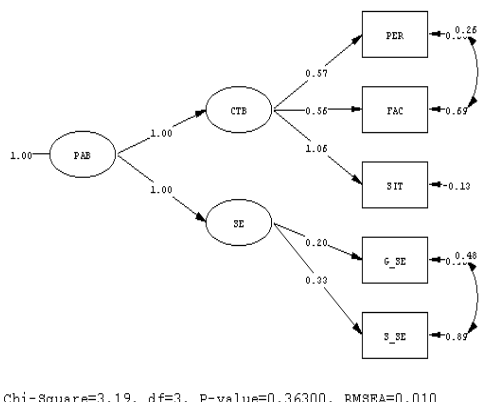


Figure 3.5. Personal agency beliefs

Figure 3. Construct validity of 5 MPCs obtained by second order factor analysis

Table 1
 Characteristics of the Samples in different Educational Degree, Geographical Region, and Jurisdiction

School type	Educational degree			Geographical region					jurisdiction							
	Bach. and lover	MA and PhD.	Total	central	northern	southern	North-eastern	Total	ONPEC	General Ed.	Min. of Univ.	Private	Vocational	Municipality	Total	
Total	Fre.	531	147	678	185	149	159	185	678	107	106	116	131	101	117	678
	%	78.32	21.68	100.00	27.29	21.98	23.45	27.29	100.00	15.78	15.63	17.11	19.32	14.90	17.26	100.00

Jurisdiction: ONPEC = the Office of Primary Education Commission; General = Department of General Education; Min. of Univ. = Ministry of University Affairs; Vocational = Department of Vocational; Private = Office of the Private Education Commission; Fre. = Frequency

Table 2

Descriptive Statistics for MPC and CARP

Factors/Indicators	Label	M	Level	SD
MPC				
Task value	TV	4.037	high	0.461
Important to	T_IMP	4.275	high	0.513
Interested in	T_INT	3.775	high	0.586
Utilities for	T_UTI	4.061	high	0.534
Emotion	EMO	3.470	moderate	0.332
positive emotion	EMO_P	3.774	high	0.443
negative emotion	EMO_N	3.031	moderate	0.401
Personal agency belief	PAB	3.262	moderate	0.427
Context belief	CTB	3.421	moderate	0.560
belief in persons	PER	3.605	moderate	0.663
belief in facilities	FAC	3.271	moderate	0.782
belief in situations	SIT	3.353	moderate	0.571
Self efficacy	SE	3.244	moderate	0.407
general self efficacy	G_SE	3.385	moderate	0.419
specific self efficacy	S_SE	3.103	moderate	0.505
Goal commitment	GC	3.184	high	0.439
persistence	PES	3.609	high	0.595
struggle	STR	2.929	high	0.682
Mental effort	ME	3.786	moderate	0.600
deliberately	DELI	3.786	moderate	0.634
concentrate on	CON	3.787	low	0.636
Total (MPC)		3.522	high	0.317
CARP				
CAR achievement	C_ACH	2.735	moderate	0.070
CAR ability	C_ABI	2.735	moderate	0.270
CAR product	C_PRO	3.130	moderate	0.486
CAR quality	C_QUA	2.975	moderate	0.616
CAR value	C_VAL	3.517	high	0.681

Total (CARP) 2.670 moderate 0.450

