

Full Length Research Paper

Developing indicators of creative and productive leadership for basic education school administrators

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This research was conducted to develop indicators and test the congruence of structural relationship model and the indicator concurrent validity of creative and productive leadership for basic education school administrators. The first phase was creation of framework and outlining factors as well as indicators by focus group discussion with 9 experts selected by purposive sampling. The second phase was creation and developing indicator. A sample of 630 people was selected by multistage sampling composed of educational administrators, school administrators, and teachers in schools under the Office of the Basic Education and the same sample of 802 people in the third phase. The third phase was congruence examination of structural relationship model of indicators with empirical data. The fourth phase involves checking concurrent validity of indicators with known-group. A sample of 139 people was implemented comprising administrators. Research instrument were focus group discussion and questionnaire. A software package was used in statistical analysis. The results showed that: Indicators of creative and productive leadership for basic education school administrators consisted with 46 indicators of 5 main factors in descending order: Production (PRO) ($\beta = 0.991$), participation (PAR) ($\beta = 0.981$), adaptation (ADA) ($\beta = 0.933$), creation (CRE) ($\beta = 0.894$), and discretion (DIS) ($\beta = 0.677$). The model fit to empirical data: Chi-Square (χ^2) = 871.021, $df = 859$, p -value = 0.3803, CFI = 1.000, TLI = 1.000, RMSEA = 0.004, SRMR = 0.017, and $\chi^2/df = 1.014$ and all indicators had concurrent validity showing the level of statistical significance of 0.01.

Key words: Creative and productive leadership, indicators.

INTRODUCTION

The Thailand 4.0 Model is a policy declared by the Thai government for the purpose of developing economy of Thailand to become one of the developed countries by

transforming the economic structure into value-based economy. This developmental approach focuses on increasing productivity relying on innovation, technology,

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and creativity to overcome middle-income, inequality, and imbalance traps. Educational management in this era enable learners to create their innovation, to have critical thinking skill, and to have literacy of global changes that can lead to abilities of valuable productivity, self- and social responsibility, and increase of global competitiveness. School administrators are key persons and highly influence quality and outcome of school management. Therefore, school administrators have to possess creative and productive leadership for efficient productivity to respond to many things changing rapidly (Sinlarat, 2016). In the meantime, leadership in the 21st century, stated by Meister (2010), consists of collaboration, building networks, developing human resources, giving straightforward information, and giving opportunities to people to learn and be able to use new technology for working including becoming aware of social responsibilities and creating innovation in the future. Similarly, Bersin (2012) additionally supports that the 21st century leadership is composed of having self-development and adaptation in accord with any changes. Also, Bohlander et al. (2001) say that modern leaders are people who can change and be flexible in working. Moreover, the leaders also have many skills such as thinking and perception, giving encouragement to the team, dedication, technology creation, and having great vision. Accordingly, the creative leadership theory developed by Ash and Persall (1999) believes, "In a school, there may be many leaders playing role of leadership in different ways, so leadership is not specifically found in administrators only". However, administrators have to be responsible for providing opportunities for teachers and team members to learn for self-development to become productive leaders as well as leaders of leaders. Based on Bellanca and Brandt (2010), the school administrators who have creativity can promote teachers' creativity as well. Stoll and Temperley (2009) clarify that creative leadership is an ability to lead others with new methods to build new creative things. As a school administrator, the author sees the development of indicators of creative and productive leadership (CPL) for basic education school administrators as important since it can be used as a guideline for improving educational quality according to the Thailand 4.0 Model that emphasizes human resources for better security, wealth, and sustainability within the country.

Objectives

1. To develop the indicators of creative and productive leadership for basic education school administrators.
2. To test the consistency between structural model of creative and productive leadership for basic education school administrators and empirical data.
3. To examine the indicators of creative and productive leadership for basic education school administrators with

known group.

Hypotheses

1. Indicators of creative and productive leadership for basic education school administrators show their fitness value with factor loading of main factors of 0.70 or over and factor loading of indicators of 0.50 or over.
2. Structural relationship model of indicators of creative and productive leadership for basic education school administrators developed from theories and research is congruent with empirical data; Chi-Square (χ^2) having no significance, or p-value showing value of over 0.05, GFI and AGFI showing value of over 0.90, and RMSEA showing value of below 0.05.
3. The developed indicators of creative and productive leadership for basic education school administrators have concurrent validity when checking with known group; having an average of 3.50 or over.

METHODOLOGY

This research used quantitative research as the major methodology and used qualitative research as the minor methodology.

Population, sample, and informant

In Phase 1 which involves creation of framework and outlining factors and indicators of creative and productive leadership for basic education school administrators, focus group technique was applied to 9 informants who were the experts selected by purposive sampling (Phophueksanand, 2014). These experts consisted of 1) 3 school administrators with qualifications of 1.1) holding academic standing of specialist director or over, 1.2) experiences in basic education school administrators at least 10 years, and 1.3) holding a doctoral degree in the field of educational administration, 2) 3 educational administrators and supervisors with qualifications of 2.1) taking a position of educational administrator or supervisor, 2.2) holding academic standing of specialist level or over, and 2.3) holding a doctoral degree in the field of education, 3) 3 academicians with qualifications of 3.1) taking a position of higher education lecturer, 3.2) holding academic standing of assistant professor or over, and 3.3) holding a doctoral degree in the field of education.

In Phase 2 which involves exploratory factor analysis of creative and productive leadership for basic education school administrators, the population consisted of 343,243 people who were educational administrators, school administrators, and teachers of 2019 academic year under the Office of the Basic Education Commission (from 225 educational service area offices composed of 2 groups, that is, Primary Educational Service Area Office and Secondary Educational Service Area Office). The sample consisted of educational administrators, school administrators, and teachers of 2019 academic year under the Office of the Basic Education Commission (from 48 educational service area offices composed of 2 groups, that is, Primary Educational Service Area Office and Secondary Educational Service Area Office). Criteria for factor analysis of Hair et al. (2010) were used for considering the sample. The acceptable sample size was minimized to 50 people and maximized to 100 people. The statistical significance of factor loading should be considered

together with the sample size in order to decide whether the factor loading have statistical significance. If the size is greater, the statistical significance of the considered loading will be lower. The factor with value of 0.30 is considered as significant in case of the sample of 350 or over. If the sample is 250, 200, 150, 120, and 100, the significant factor loading will be 0.35, 0.40, 0.45, 0.50, and 0.55, respectively. This research specified the sample size based on factor loading as 0.50, which was a statistically significant level of 0.05. Therefore, the acceptable sample size was 200 people. When considering the indicators from the questionnaire, there were 63 items used in the questionnaire for this phase, so the sample size was specified as 630 people, or 10 units per 1 variable through multistage sampling.

In Phase 3 which deals with congruence examination of structural relationship model of indicators of creative and productive leadership for basic education school administrators with empirical data, the population consisted of 343,243 people who were educational administrators, school administrators, and teachers of 2019 academic year under the Office of the Basic Education Commission.

The sample was defined as 802 people who were educational administrators, school administrators, and teachers of 2019 academic year under the Office of the Basic Education Commission (from 48 educational service area offices composed of 2 groups, that is, Primary Educational Service Area Office and Secondary Educational Service Area Office). The sample size was specified according to the Lindeman's rule suggesting that ratio between sampling units and a number of parameters or variables should be 10 to 20:1 (Schumacker and Lomax, 1996).

In Phase 4 which encompass checking concurrent validity of indicators of creative and productive leadership for basic education school administrators with known-group, the population consisted of 395 people who were school administrators holding academic standing of expert-level director of 2019 academic year under Primary and Secondary Educational Service Area Offices, the Office of the Basic Education Commission. The sample was defined as 139 people who were school administrators holding academic standing of expert-level director under both Primary and Secondary Educational Service Area Offices, the Office of the Basic Education Commission. The sample was selected by using purposive sampling technique (Hair et al., 2006).

Research instruments

For Phase 1, the instruments used in focus group discussion were document containing the outline of factors and indicators synthesized from related research, as well as record form of focus group discussion for recording recommendations related to factors and indicators of creative and productive leadership.

For Phase 2, the 63-item questionnaire for data collection, which was developed in Phase 1, was composed of 2 parts. The first part was the check-list questions about personal information of respondents including sex, age, highest level of education, employment position, and employment experience under the Office of the Basic Education Commission. The second part was suitability of indicators of creative and productive leadership for basic education school administrators employing 5-point rating scale: very high, high, moderate, low, and very low. Its content validity reviewed and evaluated by 5 experts had Item-Objective Congruence Index (IOC) between 0.80 and 1.00. Thereafter the questionnaire was tried out with a different group of 30 people with similar qualification to the sample but not getting involved in this research in order to test the reliability using Cronbach's alpha coefficient. From the test, the questionnaire had reliability of 0.989.

For Phase 3, the 46-item questionnaire was developed by the researcher based on the result of Phase 2 comprising 2 parts. The first part was the check-list questions about personal information of

respondents including sex, age, highest level of education, employment position, and employment experience under the Office of the Basic Education Commission.

The second part was suitability of indicators of creative and productive leadership for basic education school administrators employing 5-point rating scale: very high, high, moderate, low, and very low. Its content validity reviewed and evaluated by 5 experts had Item-Objective Congruence Index (IOC) between 0.80 and 1.00, or all items were qualified.

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Data collection

For Phase 1, data were obtained from the experts' opinions through the focus group technique. For Phase 2, Google Form was used to collect data from 630 informants who were educational administrators, school administrators, and teachers of 2019 academic year under the Office of the Basic Education Commission; thereafter, data were checked before being analyzed. For Phase 3, Google Form was used to collect data from educational administrators, school administrators, and teachers under the Office of the Basic Education Commission; then completeness and correctness of data were checked before being analyzed. For Phase 4, Google Form was also used to collect data in this phase; thereafter, completeness and correctness of data were checked before being analyzed.

Data analysis

For Phase 1, data analysis involved the 6-step content analysis of Krueger (1994): 1) question sequencing and allowing informants to get familiar with issues used in the discussion, 2) getting the point and taking notes, 3) coding, 4) rechecking the accuracy of data from a report by members either during or after the group discussion process, 5) checking data by discussion moderator and assistant after finishing the group discussion, and 6) feedback and sharing between participants and related parties.

For Phase 2, exploratory factor analysis (EFA) was conducted to extract and classify the factors through the principal component analysis (PCA). Also, the orthogonal rotation was employed by selecting the Varimax method facilitated by a computer program. The obtained result was then analyzed for factor reorganization.

For Phase 3, confirmatory factor analysis (CFA) used the maximum likelihood method (ML) while model validity test of indicators of creative and productive leadership for basic education school administrators used the second order confirmatory factor analysis method.

For Phase 4, concurrent validity was checked using t-test by comparing mean obtained from the know-group with prescribed criteria ($\mu \geq 3.50$).

RESULTS

As regards Phase 1, from reviewing documents and

Table 1. The result of reliability assessment of questionnaire.

Main factors	Alpha coefficient
1. Critical (CRI)	0.903
2. Creative (CRE)	0.933
3. Collaboration (COL)	0.962
4. Vision (VIS)	0.938
5. Productive (PRO)	0.946
6. Flexibility (FLX)	0.964
7. Responsibility (RES)	0.973
Total	0.989

Table 2. Result of analyzing relationships among variables.

Variable	Statistics	df	Sig
KMO: Kaiser-Meyer-Olkin measure of sampling adequacy	0.985	1953	0.000
Barlett's test of sphericity approx.chi-square	3.768		

related research as well as organized focus group discussion with the experts, 7 factors and 63 indicators of creative and productive leadership for basic education school administrators were determined: 9 indicators for critical thinking, 9 indicators for creative thinking, 9 indicators for collaboration, 9 indicators for vision, 9 indicators for productivity, 9 indicators for flexibility, and 9 indicators for responsibility. This result would be used in designing questionnaire for indicator development in the next phase. The questionnaire was then evaluated for its content validity by 5 experts. The result revealed the Item-Objective Congruence Index (IOC) between 0.80 and 1.00. After that the questionnaire was tried out with a different group of 30 people with similar qualification to the sample but not getting involved in this research in order to assess the reliability using Cronbach's alpha coefficient. From the test, the questionnaire had reliability of 0.989 as shown in Table 1.

Further, the corrected 630 questionnaire were calculated for data fitness value using the Kaiser-Meyer-Olkin Measure of Sampling, the identity matrix using Barlett's test, and significance. The result revealed that KMO is equal to 0.985, which is higher than 0.5 and gets close to 1. Thus, it can be concluded that the existing data were suitable for the use of factor analysis technique. The result of Barlett's test of Sphericity indicated the level of statistical significance of 0.01 (approx. chi-square = 3.768, sig = 0.000). Based on the result, relationships between variables could be found, and they are fit for using the technique of factor analysis as shown in Table 2.

With regard to Phase 2, considering the factor loading of 0.5 or over (Hair et al., 2014; Mukminin et al., 2018), the result of exploratory factor analysis revealed that the extracted and rotated factors had eigenvalue of 1.0 or

over, while each factor had 3 indicators or over. According to the general principle of model identification, 5 factors and 46 indicators can be possible, and the 5 factors can be renamed as 1) adaptation (ADA), 2) participation (PAR), 3) production (PRO), 4) creation (CRE), and 5) discretion (DIS). Each factor consisted of its indicators as shown in Tables 3 to 7.

Concerning Phase 3, composite indicators of creative and productive leadership for school administrators consisted of 5 main factors in descending order: production (PRO) ($\beta = 0.991$), participation (PAR) ($\beta = 0.981$), adaptation (ADA) ($\beta = 0.933$), creation (CRE) ($\beta = 0.894$), and discretion (DIS) ($\beta = 0.677$) as shown in Table 8.

Table 8 shows that the model has construct validity as can be seen from the following statistics: $\chi^2 = 871.021$, $df = 859$, $p\text{-value} = 0.3803$, $CFI = 1.000$, $TLI = 1.000$, $RMSEA = 0.004$, $SRMR = 0.017$, and $\chi^2/df = 1.014$.

In consequence, the measurement model of factors and indicators of creative and productive leadership for basic education school administrators in the model of second order confirmatory factor analysis has construct validity, or it is congruent with empirical data at pretty high level as shown in Figure 1.

Regarding Phase 4, opinion level of each indicators of creative and productive leadership for basic education school administrators showed its mean (\bar{x}) of between 4.12 and 4.57 with the level of statistical significance of 0.001 in all indicators. Thus, it can be said that 46 indicators from 5 factors had concurrent validity.

To confirm the concurrent validity of factors and indicators of creative and productive leadership for basic education school administrators, the 5-point Likert scale questionnaire containing 46 indicators was applied to the known group, that is, 139 basic education school

Table 3. Indicators of Factor 1: Adaptation (ADA).

No.	Variable	Indicator	Factor loading
1	SEL2	Being not too thirsty for win	0.758
2	SEL3	Adjusting attitude into creative thinking and action	0.710
3	SEL1	self-esteem and satisfaction with self-decision	0.702
4	PUR1	Working with diligence, responsibility, prudence, and readiness	0.637
5	PUR3	Trying to find new ways of working that harmonizes with current situation and circumstance to achieve goals with efficiently	
6	ADA2	Accepting opinions of others and any conditions from operation in every situation	0.600
7	ACC3	Seeking for and developing methods as well as improving educational quality	0.600
8	ADA3	Getting ready for any changes to get successful and for school benefits	0.592
9	CH1	Adapting how to think and work creatively according to situations	0.577
10	ADA1	Adapting to situations rapidly and properly	0.565
11	PUR2	Having a process for quality assessment of work relying on using resources	0.565
12	ACC2	Trying not to surrender to any kinds of problems or obstacles	0.533
13	CH2	Promoting members and networks to get involved in improving work performance	0.528
14	ACC1	Accepting when any mistakes are made	0.527

Table 4. Indicators of Factor 2: Participation (PAR)

No.	Variable	Indicator	Factor loadings
1	PAR3	Using principles of collaboration to work with transparency and accountability	0.709
2	PAR2	Having the principles in working together	0.684
3	TRU3	Cooperation	0.662
4	PAR1	Promoting all sectors to participate in sharing ideas, making decisions, planning, monitoring, evaluating, and improving for better work performance	0.649
5	DEC3	Encouraging confidence to achieve the mission of school	0.637
6	CON3	Using peaceful way to handle with conflicts among parties	0.608
7	TRU1	Building reliability in operation and following the given arrangement with strictness	0.593
8	TRU2	Being responsible and diligent to become successful	0.556
9	REA1	Performing based on justice	0.532
10	CON2	Being able to analyze the causes of conflicts happening in school	0.528
11	FOR2	Being able to analyze circumstances both inside and outside school for future prediction of school	0.511

Table 5. Indicators of Factor 3: Production (PRO).

No.	Variable	Indicator	Factor Loadings
1	EFI3	Improving performance continuously using resources effectively	0.624
2	BEN3	Having acceptable best practice	0.620
3	EFF2	acquisition of means, ideas, methods, products, and innovation to create new alternatives for better outcomes	0.615
4	EFI2	Motivating colleagues	0.610
5	BEN1	Creating works/innovation reflecting modernity to benefit individual, social, and environment sufficiently	0.607
6	EFI1	Providing management system of educational resources with lowest cost but highest benefits	0.578
7	BEN2	Satisfaction to all stakeholders	0.575
8	EFF3	Promoting both teachers and students to create innovation	0.558
9	EFF1	Applying knowledge and skills to creation of innovation to achieve highest goals of school	0.512

administrators possessing creative and productive leadership. The obtained mean at high level ($\mu \geq 3.50$), which was based on the criterion reference, was

compared and the result indicated the concurrent validity with the level of statistical significance of 0.001 as shown in Table 9.

Table 6. Indicators of Factor 4: Creation (CRE).

No.	Variable	Indicator	Factor Loadings
1	CHA1	Creating motivation and daring to make decisions carefully under high-risk condition without fear of any mistakes	0.719
2	CHA3	Setting big and clear goals at work	0.701
3	CHA2	Opening to new experiences to achieve big goals efficiently	0.687
4	ORI1	Applying information and references to working reasonably	0.623
5	ORI3	Having self-confidence and creating new things to achieve highest goals of school	0.613
6	IMA3	Being able to analyze future trends to use them for making working plans efficiently	0.588
7	IMA1	Being creative in improving how to work to achieve goals	0.569
8	IMA2	Analyzing situations using vision and experience to prevent possible problems	0.562
9	ORI2	Being confident to choose the best practice to achieve goals of school	0.559

Table 7. Indicators of Factor 5: Discretion (DIS).

No.	Variable	Indicator	Factor Loadings
1	ANA2	Analyzing policies for school mission and roles of school administrators	0.758
2	ANA1	Conducting projects applying knowledge, principles, concepts, and importance to analysis from start to finish	0.747
3	ANA3	Creating products through analysis of goals and directions of school clearly by considering situations happening in society in all dimensions	0.724

Table 8. Statistics used for testing model validity of second order confirmatory factor analysis of creative and productive leadership.

Latent Variable	X ²	df	X ² /df	P -value	CFI	TLI	RMSEA	SRMR
CPL	871.021	859	1.014	0.3803	1.000	1.000	0.004	0.017

DISCUSSION

According to the results, the indicators of creative and productive leadership for basic education school administrators consisted of 5 factors (that is, TPPCD): adaptation (ADA), participation (PAR), production (PRO), creation (CRE), and discretion (DIS). These factors included fit and congruent 46 indicators. It was possible that factors and indicators of creative and productive leadership for basic education school administrators were synthesized through several experts as well as both qualitative and quantitative research methodology as expressed in the following details.

1. From reviewing theories, concepts, and related studies, this research received 8 main factors and 90 indicators; thereafter, the focus group discussion with the experts was organized. After the focus group discussion, this research gained 7 main factors and 63 indicators. After performing the exploratory factor analysis, the extracted and rotated factors had the factor loading of 0.5 or over, eigenvalue of 1.0 or over, and 3 indicators or over included in each factors according to the three indicator rule; a factor dispersing into a new one

(Vanichbuncha, 2018). Furthermore, the reorganized 5 factors and 46 indicators were renamed by factor loading in descending order: production (PRO) ($\beta = 0.991$), participation (PAR) ($\beta = 0.981$), adaptation (ADA) ($\beta = 0.933$), creation (CRE) ($\beta = 0.894$), and discretion (DIS) ($\beta = 0.677$).

The first factor is adaptation (ADA). School administrators do not have to get too thirsty for win. They additionally have to adapt or make their action and thinking more creative; in other words, they ought to have self-control to transform negative emotion into positive emotion. Also, they have to be satisfied with what they have and choose to be a good role model for others.

Based on Smit and Wandel (2006) and Seyayongka (2013), human adaptation is an action performed to handle different types of change by analyzing and measuring situations and effects so that goals at work can be targeted. Similarly, the Office of the Education Council, Ministry of Education (2014) states that education is an important tool for national reform and human resource development to respond to the social needs and get prepared for the 21st century with 5 ways of adaptation. First, Thai citizen's identity should be

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 p-value = 0.3803
 CFI = 1.000 TLI = 1.000
 RMSEA = 0.004
 SRMR = 0.017
 $\chi^2 / df = 1.014$

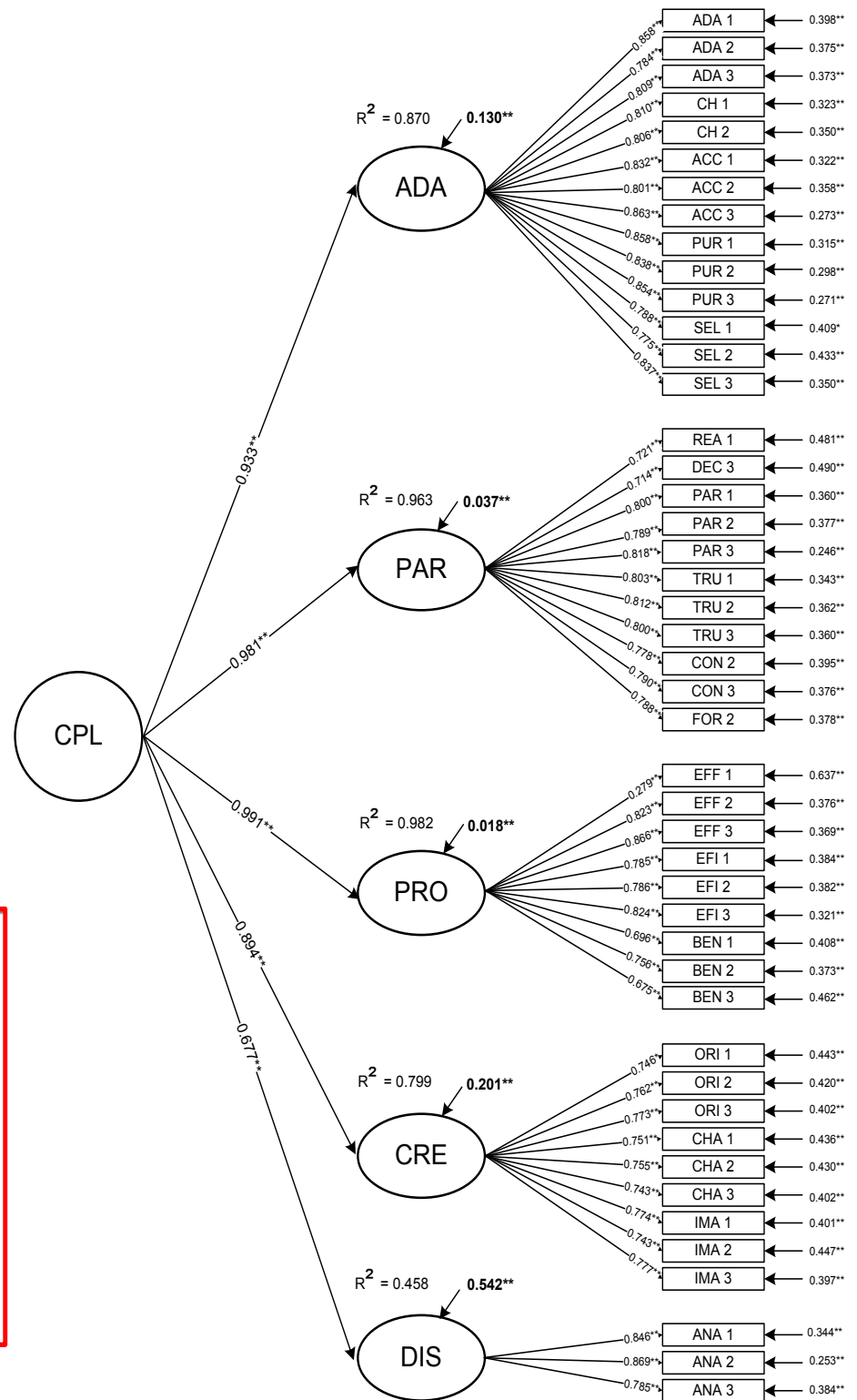


Figure 1. Model of second order confirmatory factor analysis for indicators of creative and productive leadership.

transformed into universality. Second, reorientation of human resource should be changed from producing for industrial responses to producing for living and social

responses. Third, paradigm should be adapted from overcoming nature to living with nature. Fourth, culture should be transformed from competition into collaboration

Table 9. Result of concurrent validity of indicators of creative and productive leadership for basic education school administrators checked with known group.

No.	Indicators	n = 139			P -value
		\bar{x}	SD	t	
1	ADA1	4.32	0.66	109.282	0.000
2	ADA2	4.45	0.64	115.205	0.000
3	ADA3	4.40	0.64	113.999	0.000
4	CH1	4.33	0.65	110.782	0.000
5	CH2	4.40	0.63	116.032	0.000
6	ACC1	4.47	0.65	115.566	0.000
7	ACC2	4.39	0.66	110.227	0.000
8	ACC3	4.41	0.68	107.633	0.000
9	PUR1	4.42	0.66	112.087	0.000
10	PUR2	4.39	0.67	109.336	0.000
11	PUR3	4.46	0.65	114.400	0.000
12	SEL1	4.44	0.60	124.163	0.000
13	SEL2	4.45	0.64	115.246	0.000
14	SEL3	4.45	0.63	117.268	0.000
15	REA1	4.50	0.64	117.309	0.000
16	DEC3	4.50	0.63	119.432	0.000
17	PAR1	4.45	0.66	112.347	0.000
18	PAR2	4.47	0.66	112.737	0.000
19	PAR3	4.52	0.66	113.893	0.000
20	TRU1	4.37	0.68	107.669	0.000
21	TRU2	4.51	0.63	118.457	0.000
22	TRU3	4.57	0.64	119.849	0.000
23	CON2	4.36	0.72	100.808	0.000
24	CON3	4.50	0.69	108.077	0.000
25	FOR2	4.45	0.66	112.347	0.000
26	EFF1	4.47	0.64	116.648	0.000
27	EFF2	4.36	0.69	106.096	0.000
28	EFF3	4.44	0.64	116.186	0.000
29	EFI1	4.44	0.64	115.168	0.000
30	EFI2	4.35	0.65	112.409	0.000
31	EFI3	4.46	0.62	120.757	0.000
32	BEN1	4.25	0.66	106.657	0.000
33	BEN2	4.32	0.67	108.313	0.000
34	BEN3	4.20	0.71	98.990	0.000
35	ORI1	4.20	0.66	106.288	0.000
36	ORI2	4.27	0.63	113.611	0.000
37	ORI3	4.33	0.62	115.886	0.000
38	CHA1	4.19	0.66	105.946	0.000
39	CHA2	4.27	0.70	101.233	0.000
40	CHA3	4.24	0.69	101.994	0.000
41	IMA1	4.31	0.66	109.526	0.000
42	IMA2	4.27	0.66	107.050	0.000
43	IMA3	4.22	0.68	102.983	0.000
44	ANA1	4.12	0.66	103.634	0.000
45	ANA2	4.18	0.69	100.732	0.000
46	ANA3	4.18	0.65	107.434	0.000

and fellowship. And fifth, Thailand should be upgraded to become one of the first world nations by building the prestige of patriotism. Suwansawat (2019) supports that educational administrators should understand and adjust themselves to the changes in the disruption era. Therefore, they do not have to stick to the previous success because the word “security” may not be possible in the disruption era. In other words, failure can happen to people in all social classes at any time. Thus, leaders have to possess clear vision and be ready to learn new things all the time. Also, trust in organization has to be built by promoting all members to have learning avidity and realize that self-development is important.

The second factor is participation (PAR). The principles of participation and collaboration with transparency and accountability are used. Participative management, defined by Rakliang (2013), is provision of opportunities for the stakeholders to get involved in sharing ideas, making decisions, planning, doing, supporting, monitoring, evaluating, solving problem, taking responsibilities and taking pride in overall operation and awards, along with welcoming any complaints. Thongdi (2018) says that those who are administrators have to listen to other members’ opinions in order to raise their self-confidence as well as organizational commitment. Moreover, the administrators have to decentralize and support the members in many things such as cooperative problem solving, learning new things, listening to others, and showing honor to one another. These supports can reduce interpersonal conflicts and create moral support as well as better workplace atmosphere. The third factor is production (PRO). Teachers and students are promoted to create their own innovation with acceptable best practice, concepts, methods, and new alternatives for better outcomes. Sinlarat (2016) says that the administrators ought to have creative and productive mind and create innovation. Moreover, power has to be generated for operational support and developed into best practices or best doing. The basis of this strategy consists of rethinking, reinventing, and retaking social responsibility. Also, Arunwong et al. (2017) explained the concept of Newell et al. (1963) in terms of considering one of the creative products by using the following criteria: (1) products that are regenerated and valuable for thinker, social, and culture, (2) products that are not in line with phenomenalism in case of adaptive thinking and product cancellation or previous acceptable concept, (3) products that are highly and steadily encouraged in long term or with high attempt, and (4) products that are obtained from analysis of problems which are pretty unclear or ambiguous.

The fourth factor is creation (CRE). The administrators have to create motivation and daring to make decisions carefully under high-risk condition without fear of any mistakes. Also, big and clear goals at work are set, and opening to new experiences is one important thing to do to achieve big goals efficiently. As stated by Othakanon (2018), the leaders in innovative and intelligent

organizations should have the characteristics of bravery and being accountable for inventing to get better overall outcome by giving opportunities to everyone in using creative thinking that leads to new inventions. Furthermore, Sinlarat (2015) says that the administrators have to be responsible for empowerment and development because it is impossible that only one person can achieve success. Therefore, the administrators have to motivate others and build self-empowerment for better collaboration. According to Songboonsart (2016), school administrations’ behaviors and actions of using creativity in innovation production and educational promotion and management can encourage teachers and educators in creativity relying on technology and information. Also, the administrators can promote and motivate teachers to increase their creativity through brainstorming and other methods.

The fifth factor is discretion (DIS). According to the Professional Development Curriculum for Teachers and Educational Personnel specified by the Office of the Basic Education Commission (2019) on school director appointment, the designed learning units are composed of analysis and synthesis policies for school mission and roles of school administrators. This is to promote those who would be the school directors to have the following abilities: developing strategic plans in accordance with the school context, making decision based on information and principles rightly, applying the principles of good governance to school administration, managing educational resources effectively, managing internal quality assurance system, promote teacher as well as educational personnel to show their academic potentials, managing the network party system for school development, and doing supervision, monitoring, evaluation, and report as well as analyzing laws, regulations, rules, and guidelines related to school director’s performance, and other related issues. Sinlarat (2016) supports that the administrators should have clear results of analysis on goal and direction of school by considering current social situations in all dimensions.

There were two important findings regarding the congruence of structural relationship model of indicators school administrators with empirical data. (1) Measurement model of each main factor developed from theories and studies was very well congruent with empirical data. From this result, the 46 indicators became important to the indicators of creative and productive leadership for basic education school administrators. (2) From the second order confirmatory factor analysis of 5 factors and 46 indicators, the structural relationship model of indicators of creative and productive leadership for basic education school administrators developed from theories and studies was very well congruent with empirical data. This finding showed the following statistics: Chi-Square (χ^2) = 871.021, df = 859, P-value = 0.3803, CFI = 1.000, TLI = 1.000, RMSEA = 0.004, SRMR = 0.017, and χ^2/df = 1.014. As a result, it could affirm the research hypotheses because factors and indicators of creative and productive

leadership were synthesized by various experts together with employing both quantitative and qualitative research methodology, and they were then checked by the known group. Additionally, in recent and current situations, the basic education school administrators have been developed in terms of characteristics or behaviors to be in line with theories and studies as the main factors. Also, the indicators used in the research could reflect the actions of the basic education school administrators that were consistent with the policy of organization having responsibility in education personnel development. For instance, (a) the National Institute for Development of Teachers, Faculty Staff and Educational Personnel (2016) together with the Office of the Basic Education Commission introduced policy, plan, and guideline on development of teachers, faculty staff and educational personnel. The curriculum of teacher and educational personnel development was provided before getting appointed and promoting the school director, deputy director and director of the educational service area for 2 main purposes. (i) Core competency improvement was composed of achievement motivation, service mind, expertise, and teamwork. (ii) Functional competency improvement was composed of analytical thinking and conceptual thinking, communication influencing, caring and developing others, and visioning. (b) The Office of the Basic Education Commission (2016) had a policy on promoting the leadership skill for school administrators so that they can get more insight in their own experience and leadership and can realize the way to deal with any conflicts at work and promote behaviors including leadership skills to achieve goals under challenging conditions. (3) The Office of the Basic Education Commission (2019) released a policy for the 2016 fiscal year to encourage individual excellence in the school administrators in terms of innovative and strategic thinking, academic leadership, accountability, and cooperative administration.

To confirm the concurrent validity of factors and indicators of creative and productive leadership for basic education school administrators, the 5-point Likert scale questionnaire containing 46 indicators was applied to the known group, that is, 139 basic education school administrators possessing creative and productive leadership. The obtained mean at high level ($\mu \geq 3.50$), which was based on the criterion reference, was compared. The result indicated the concurrent validity with the level of statistical significance of 0.001. According to the result, it can be applied to organizational administration in many dimensions such as policy formulation, strategic planning, human resource development, training program development, etc. In consequence, the Office of the Basic Education Commission should promote the school administrators under the area of responsibility to put these 46 indicators of creative and productive leadership into practice. This promotion can enhance teachers' creative and productive

leadership that is beneficial towards quality development of students based on the Thailand 4.0 policy that aims to bring the country into security and sustainability.

Suggestions

- 1) Educational institutes should apply the obtained indicators to measurement of creative and productive leadership for educational administrators, school administrators, and teacher. Also, the outcome of this research should be used as information for developing educational personnel.
- 2) Variables or factors influencing creative and productive leadership for school administrators should be investigated during further research.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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