A CONFIRMATORY FACTOR ANALYSIS OF TEACHER EDUCATORS' PROFESSIONAL CAPITAL QUESTIONNAIRE

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Abstract

In this study is to measure professional capital of teacher educators by using teacher professional capital questionnaire. The teacher professional capital questionnaire was developed by Hargreaves and Fullan (2012). Professional Capital Survey for Teacher measures the systematic development and integration of three types of capital – human, social, and decisional – with the teaching profession". The original questionnaire comprised of 36 items that separated into the three dimensions (human, social, and decisional) with a 5point Likert Scale. The researcher adapted the response scale to a 4point Likert Scale used (1= strongly disagree, 2= disagree, 3= agree, 4 = strongly agree) to get for a firm decision by the respondents. The aim of the study was to validate the professional capital questionnaire in a sample of teacher educators from Education Degree Colleges by using confirmatory factor analysis (AMOS). A total 370 teacher educators from the Education Degree Colleges were selected to examine the psychometric properties of the scale. The results of the confirmatory factor analysis showed that the model fits with the three factors structure (TLI=0.904, CFI= 0.914, SRMR= 0.059, RMSEA=0.038, *p*=0.00). Besides, the convergent and discriminant validity and internal consistency = 0.860 supports the accuracy of the 28 items of professional capital questionnaire that use in Myanmar to measure professional capital of teacher educators.

Keywords: Professional Capital, Capital, Confirmatory Factor Analysis, Teacher Educators

Introduction

In teaching profession, the task of teacher educators is not as easy as it seems. Nowadays, professional capital can be utilized to distinguish between amateurs and professionals among teacher educators. Professional capital is, of course, about the qualities and talents of individuals. Professional capital highlights the importance of the individual and collective assets of teachers that underpin effective professional performance, and subsequent student learning. Hargreaves and Fullan (2013) positions professional capital in the teaching profession as a key component of "individually updated elevate the team's performance and increase quality throughout the whole profession". Professional capital of teacher is the result of human capital (quality of the individual), and social capital (quality of interactions within a group), and decisional capital (quality in making good decisions based on information and professional judgment).

When most teachers came as a model of professional capital, they become smart, capable, committed, collegial, determined, thoughtful, willing to learn, discreet and wise. Their moral purpose is expressed in their tireless and savvy mission of serving their students and their communities, and in learning, always learn how to do it right. When teachers teach like a pro, people trust them because there are highly qualified people who have undergone rigorous training that connects theory to practice and stay many years in the job, constantly perfecting their craft.

Professional capital is essential for the most effective and necessary teaching in the most challenging educational situations. Educators with sound professional capital have a strong sense of certainty and tend to proactively seek learning opportunities and critically question policies

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and strategies that inform their practices (Eraut, 2012). According to Hargreaves and Fullan (2012), professional capital enables teacher educators to perform like professionals.

Since professional capital plays an important part in developing the professionalism among teacher educators, it becomes essential to develop the reliable scale for teacher educators in Myanmar. By using confirmatory factor analysis (AMOS) on professional capital scale, this study will helps to provide the valid and reliable scale so as to be able to detect the professional capital of Myanmar teacher educators.

Purpose of the Study

The main purpose of the study is to validate the professional capital questionnaire to measure professional capital of teacher educators from Education Degree Colleges in Myanmar.

Definitions of Key Terms

Professional Capital: Professional Capital is a concept that shows professionalization of teaching should be critical and fostered through the process of capacity building over time (Hargreaves & Michael Fullan, 2012).

Capital: Capital refers to "assets that can be leveraged to accomplish desired goals" (Hargreaves & Fullan, 2012).

Confirmatory Factor Analysis: Confirmatory factor analysis is a hypothesis testing method which tests whether the obtained the data set is suitable for a model (Schriesheim, Hurley, & Scandura, 1997).

Teacher Educator: Nowadays, the term “teacher educators” commonly refers to both those who educate prospective teachers and those who educate practicing teachers, that is, to those who initiate, guide, and support teacher learning across the lifespan (Even, 2005).

Related Literature Review

Theory of Professional Capital

In Professional Capital: Transforming Teaching in Every School, Andy Hargreaves and Michael Fullan (2012) propose the concept of professional capital that demonstrates professionalization of teaching must be important and promoted through the process of capacity building over time. The concept of professional capital may have a potential for the current teaching workforce to empower themselves to raise the professionalization of teaching. Commonly, a 'profession' is characterised by self-regulation, specialized knowledge, and adherence to a code of ethics formulated by members (Evetts, 2006). Relatedly, among the keys elements that characterise most conceptions of professionalism are practitioner autonomy, quality and ethical standards.

Professionalism entails "the identification and expression of what is required and expected of members of a profession" (Evans, 2008). As such, "professionalism" highlights improved "quality and standards of practice" (Hargreaves, 2000). For Hargreaves and Fullan (2012), capital refers to "assets that can be leveraged to accomplish desired goals" The concept of professional capital includes "resources, investments, and assets that comprise, define, and develop professional and practice".

Leading teacher education scholars Andy Hargreaves and Michael Fullan (2012) identify three elements of professional capital of teachers, namely human capital, social capital and decisional capital. Professional capital is a function of the interactive combination of the three elements. Hargreaves and Fullan (2012) argue, "if one of the elements of the right-hand side of the equation (PC=f (HC, SC, DC)) is missing, then professional capital will be useless and the standard of teaching will fall short".

Hargreaves and Fullan (2012) place human capital as the crucial factor of professional capital in teaching profession. In the concept of human capital as a personal asset, Hargreaves and Fullan (2012) argue that human capital is about individual abilities as “having and developing the necessary knowledge and skills”. Human capital is the qualities of the individuals, their qualifications and competencies—such as teacher experience, subject knowledge, and pedagogical skills. In teaching, human capital is "about knowing the subject and knowing how to teach, knowing the children and understanding how they learn". Beyond pedagogic and subject knowledge, human capital comprehends "understanding the diverse cultural and family circumstances in which your students come from, being familiar with and able to sift and sort the science of effective and creative practice, and having the emotional abilities to empathizes with diverse groups of children and also adults in and around the schools.

Hargreaves and Fullan (2012) emphasize that social capital plays an important role in the development of professional capital because using social capital; a given group can generate sparks between different human capitals, which is impossible for one person to do. Realizing each teacher as a professional, a collaborative network to develop their knowledge and skills in the long term should lead to the cultivation of professionalism in teaching as a whole. Groups, teamwork, and collaboration are a powerful communication for teachers, school staffs and school leaders. School-level professional capital through its network should be circulated, shared, developed, and sustained. In the teaching profession, social capital is a form of 'collective capacity; and the social capital of teachers refers to "how the quantity and quality of interactions and social relationship" among themselves and with other relevant actors "affects their access to knowledge and information; their sense of expectation, obligation, and trust; and how far they are likely to adhere to the same norms or codes of behavior" (Hargreaves & Fullan, 2012).

The third component to construct professional capital in teaching is decisional capital. Decisional capital is a concept that arises from the field of law, and refers to the ability of an individual to make the right decisions when there is no concrete answer (Hargreaves & Fullan, 2013). Decisional capital refers to “the capital that experts acquire and accumulate through structured and unstructured experience, practice, and reflection - capital that allows them to make wise decision in situations where there are no fixed rules or indisputable proof to guide them”. Decisional capital is about teachers' capacity and freedom to make sound judgement in their practices. As professionals, teachers with decisional capital are predisposed to "exercise their judgements and decisions with collective responsibility, openness to feedback, and willing transparency"(Hargreaves & Fullan, 2012).

Confirmatory Factor Analysis

Confirmatory factor analysis has become established as an important analysis tool for many areas of the social and behavioral sciences. It belongs to the family of structural equation modeling techniques that allow for the investigation of causal relations among latent and observed variables in a priori specified, theory-derived models. The main advantage of CFA lies

in its ability to aid researchers in bridging the often-observed gap between theory and observation. CFA can give the investigator valuable information regarding the fit of the data to the specific, theory-derived measurement model (where items load only on the factors they were designed to measure), and point to the potential weakness of specific items. CFA is best understood as a process, from model conceptualization, identification and parameter estimation, to data-model fit assessment and potential model modification. The main purpose of confirmatory factor analysis is to confirm or disconfirm some priori theory (Mueller & Hancock, 2001).

Method

Sample of the Study

The participants of the study were chosen by using stratified random sampling technique. Teacher Educators from Education Degree Colleges were selected as samples of the study. Firstly, four states (Shan, Mon, Rakhine and Kayar) and three regions: (Yangon, Bago, and Tanitharyi) were selected. Therefore, altogether 11 education degree colleges and 370 teacher educators were chosen for this study.

Research Method

In this study, descriptive survey design and quantitative approach were used.

Instrument

To measure Professional Capital, Professional Capital Questionnaire developed by Hargreaves and Fullan (2012) was used in this study. Professional Capital Survey for Teacher measures the systematic development and integration of three types of capital – human, social, and decisional – with the teaching profession". The original questionnaire comprised of 36 items that separated into the three dimensions (human, social, and decisional) with a 5 point Likert Scale. But, the researcher adapted the response scale to a 4 point Likert Scale to get for a firm decision by the respondents. ". The items were rated on four-point likert Scale (1 = strongly disagree, 2= disagree, 3= agree and 4= strongly agree).

Human Capital - Item number 1 to 12 stands for human capital that consists of the individual assets, skills, and personal qualities that each teacher brings to school. The sample items were "I regularly search for professional learning opportunities to improve my teaching".

Social Capital - Item number 13 to 23 stands for social capital that refers to "how the quantity and quality of interactions and social relationship among people affects their access to knowledge and information". The sample items were "I regularly examine student work in collaboration with other teachers".

Decisional Capital - Item number 24 to 35 stands for decisional capital that is ability to make discretionary judgements as an educator involving the development of expertise and professional judgements and incorporates the skill of individuals and groups to make effective decisions. The sample items were "On any given day, I would be able to provide evidence of what worked.

Data Collection Procedure

Professional Capital Questionnaire developed by Hargreaves and Fullan (2012) was used in this study. All of the items in this study were translated and modified into Myanmar version.

After preparing the measuring questionnaire, expert review was conducted for face validity and content validity by 16 experts who have special knowledge and well experience in the field of Educational Psychology. After content validation, based on the criticisms and suggestions of experts, some items were revised and one of the items is inconsistent with Myanmar culture and omitted this item from original questionnaire. Therefore, there are altogether 35 items in professional capital instrument.

The pilot testing was done during from June to September, 2020 to test whether the wording of items, statements and instructions had their clarity in Myanmar version and was appropriate and relevant to teacher educators. Pilot testing was conducted with 370 teacher educators from Hlegu Education Degree College, Thingangyun Education Degree College, Dawei Education Degree College, Kayar Education Degree College, Taunggyi Education Degree College, Pyay Education Degree College, Hpa-An Education Degree College, Kyaukphyu Education Degree College, Taungoo Education Degree College, Lashio Education Degree College and Kyainge Tong Education Degree College in the light of their responses, some items are revised.

After pilot study, researcher calculated confirmatory factor analysis by using AMOS software to confirm questionnaire may be model fit. In order to support the evidence of construct validity, convergent validity, discriminant validity and reliability can be analyzed by the use of Microsoft excel. Based on the result of the validation study, the researcher was developed professional capital questionnaire.

Research Findings

The Results of Confirmatory Factor Analysis

Confirmatory factor analysis was used to develop the reliable scale for teacher educators in Myanmar. Confirmatory factor analysis is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs.

With confirmatory factor analysis (CFA), the researchers use a variety of fit indices to determine whether the model fit is acceptable or not. These indices include measures of global fit, or fit of the entire model to the data, such as the Goodness of Fit Index (GFI), chi-square, Tucker-Lewis Index (TLI) which is the same as Non-normed Fit Index (NNFI), Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR) and Comparative Fit Index (CFI). Hu and Bentler (1999) recommended that the maximum cutoff value of 0.8 for RMSEA and the cutoff value of 0.6 for SRMR and the minimum cutoff value of 0.90 for TLI and CFI and a *p*-value for the Chi-square less than 0.005 can be considered as the model is a goof fit. There is the table for fit indices for assessing the goodness of fit in CFA (Bentler, 1990).

Table 1: Fit Indices for Assessing the Goodness of Fit in Confirmatory Factor Analysis (CFA) (Bentler, 1990)

Name	Index	Level of acceptance
Discrepancy chi square	Chisq	0.000
Comparative fit index	CFI	>0.09

Name	Index	Level of acceptance
Tucker-Lewis Index	TLI	>0.09
Root Mean Square of Error of Approximation	RMSEA	<0.08
Standardized Root Mean Square Residual	SRMR	<0.08

Further assessment of validity involved an assessment of construct validity: convergent validity and discriminant validity. Convergent Validity for the subscales was assessed by estimating the composite reliability (construct reliability) for each subscale and an assessment of the factors' average variance extracted (AVE). Hair, Black, Babin, and Anderson (2009) stated that an item factor loading ≥ 0.5 and $p < .05$, AVE ≥ 0.5, and CR ≥ 0.6**.** Moreover, Malhotra and Dash (2011) argue that AVE is often too strict, and convergent validity can be established through CR alone.

Factor Proposed Model

Table 2: Factor Proposed Model of Teacher Professional Capital Questionnaire

Name	Index	Level of acceptance
Discrepancy chi square	Chisq	0.000
Comparative fit index	CFI	0.656
Tucker-Lewis Index	TLI	0.632
Root Mean Square of Error of Approximation	RMSEA	0.064
Standardized Root Mean Square Residual	SRMR	0.062

If the CFI, TLI values are higher than 0.90 and RMSEA value ranges from 0.05 to 0.1 (Awang, 2012), the data fit to the model (as cited in Shamsuddin, 2015). Based on the Table 2, CFI and TLI did not reach adequate value. So, the model was re-specified. So, Hooper, Cough and Mullen (2008) expressed that it is a good to remove the items with low R2 values (less than 0.2) from the analysis to remove the better model fit. In the present analysis, item 3, 5, 10, 11, 23 and 25 had R2 value of 0.1 (less than 0.2). Therefore, these items were removed from this study.

Moreover, according to Anderson and Gerbing (1984), another way of improving model fit is through the correlation of error terms. The correlated error terms showed that there is additional information in the data that has not exploited in the current model. It also means that the observed covariation between a given pair of indicators has not been adequately accounted for by the factors present in the model. Positive values of correlated error terms mean that the model under predicts the particular indicator covariance whereas negative value mean that the model over predicts this covariance. Then, after correlated error terms, the analysis was run to get a perfect model fit. The final model for teacher professional capital with 28 items was shown in table 3.

Model Fit Statistics

Table 3: Model Fit Statistics for Teacher Professional Capital Questionnaire

Name	Index	Level of acceptance
Discrepancy chi square	Chisq	0.000
Comparative fit index	CFI	0.914
Tucker-Lewis Index	TLI	0.904
Root Mean Square of Error of Approximation	RMSEA	0.038
Standardized Root Mean Square Residual	SRMR	0.059

Based on the data presented in Table 3, CFI and TLI was greater than 0.9 and RMSEA ranged from 0.05 to 0.1 and chi-square was found significant at $p<0.001$. Therefore, the model fit indices of teacher professional capital questionnaire with 28 items.

Validity and Reliability of Teacher Professional Capital Questionnaire

Content Validity

Content validity was conducted by 16 experts who have special knowledge and well experience in the field of Educational Psychology.

Convergent Validity

Convergent validity is also an evidence to test construct validity. To establish convergent validity, factor loading of the indicator variables, composite reliability (CR) and average variance extracted (AVE) should be used. AVE and CR values were computed by the formula using Microsoft Excel. Table 4 showed that the result of AVE and CR of teacher professional capital questionnaire.

Table 4: Construct reliability (CR) and average variance extracted (AVE) of Teacher professional capital questionnaire

Factor	CR	AVE
Human Capital	0.652	0.314
Social Capital	0.688	0.414
Decisional Capital	0.710	0.403

The AVE values for the model ranged from 0.314 to 0.414. The CR values ranges from 0.65 to 0.71. According to Hunang et al (2013), the value of AVE should be greater than equal to 0.5 and CR should be 0.6 and above. According to Table 4, AVE values were nearly 0.5 and CR values were above 0.6. Another assumption is that when CR is greater than AVE, convergent validity was achieved for this construct. Therefore, teacher professional capital questionnaire was assumed that it was a valid questionnaire to measure teachers' professional capital in Myanmar.

Discriminant Validity of Teacher Professional Capital Questionnaire

Discriminant validity was used to show that the construct is actually differing form one another empirically. Discriminant validity was evaluated with square root of AVE with correlations of latent construct. The results were shown in Table 5.

Table 5: Discriminant Validity of Teacher Professional Capital Questionnaire

Factors	Human Capital	Social Capital	Decisional Capital
Human Capital	**0.56**		
Social Capital	0.492	**0.643**	
Decisional Capital	0.422	0.444	**0.635**

The diagonal numbers in bold are the square root of AVE values.

According to Table 5, all the square root of AVE values was greater than 0.5 and these values were greater than all the inter-latent factor correlations for all factors in the relevant rows and columns. According to Fornell and Larcker (2011), square root of AVE should be above 0.5. Then, according to Hair et al (2011), square root of AVE values was greater than the inter-latent factor correlations. Thus, the results of the discriminant validity of Teacher Professional Capital were congruent with Fornell and Larcker and Hair et al (2011). According to Table 5, discriminant validity can be accepted for the measurement model and the discriminant model and the discriminant validity between the constructs.

Reliability of Professional Capital Questionnaire

After the result of confirmatory factor analysis, the final questionnaire consisted of three subscales with 28 items in this study. Table 6 showed that the number of items retained and described reliability coefficient for each subscale.

Table 6: Number of Items retained and Reliability Coefficient for each subscale

Factor	**Number of items**	**Cronbach' Alpha**
Human Capital	7	0.704
Social Capital	11	0.766
Decisional Capital	10	0.735
Total	28	0.860

Based on Table 6, reliability coefficient of each subscale ranged from 0.704 to 0.766 and the reliability coefficient of the whole questionnaire was 0.860. Thus, the professional capital questionnaire was reliable to measure teachers' professional capital in teacher education in Myanmar. Based on the results of adaptation and validation processes, professional capital questionnaire was reliable and valid in measuring professional capital of teacher educators.

Discussions

Aim of the research is to identify teacher educators are investigated through development of professional capital namely human capital, social capital and decisional capital through systematic review of existing literature. This study was carried out to develop professional capital questionnaire of teacher educators that was suitable in Myanmar culture. To confirm questionnaire may be model fit, CFA was applied. All the model fit indices (CFI=0.914, TLI=0.904, SRMR= 0.059, RMSEA=0.038 and p=0.00) indicated a good fit between the measurement model tested and the data.

After that, it was determined to be valid. The convergent validity of professional capital questionnaire was indicated by good composite reliability values and acceptable AVE values. The discriminant validity of the model was also indicated by the AVE values. The questionnaire was also found to be to be reliable in terms of the factors and internal consistency of the entire factors. As for the internal consistency reliability, the values of Cronbach's alpha pointed out the satisfactory results for reliability of professional capital questionnaire. Based on the data and results, the teachers' professional capital questionnaire has adequate psychometric properties (valid and reliable). Finally, the model fit indices of teacher professional capital questionnaire with 28 items.

The primary purpose of this study was to develop psychometrically sound questionnaire to examine teacher educators and to that end, the initial validation of the Teachers' professional capital was successful. This study could possibly assist principals in shaping what planned professional capital they need to be providing for their teacher educators to develop their profession. Beyond the scope of the instrument, future studies should continue to investigate its validity. This instrument should also be validated with different population group, and if it were validated with other culture group, it could potentially be used to assess cultural differences with respect to teachers' professional capital.

Conclusion

Ramsden (2003) claimed that education plays a significant role in developing and shaping the economic and social development for nations in a competitive world. In knowledge-based economics, governments would view universities as a platform for change in the society and expanding prosperity. Therefore, there is necessity for highly skillful and trained graduates in nations to plan and execute thoughtful plans for improving the teaching quality in the education as mentioned in Little et al, (2007).

Ameeta et al (2005) pointed out that the major goal of any teacher’s education or training programme is to develop teachers for initiating desired results in learning among students to optimize the resources namely material and human. Teacher education is needed for inducting fresh or new teachers and tries to change them into effective and competent teachers.

According to Professor Hargreaves and Fullan (2012) professional capital enables teachers to perform like professionals. When most teachers came as a model of professional capital, they become smart, capable, committed, collegial, determined, thoughtful, willing to learn, discreet and wise. Their moral purpose is expressed in their tireless and savvy mission of serving their students and their communities, and in learning, always learn how to do it right.

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