A STUDY ON COLLABORATION AMONG FACULTIES/INSTITUTES OF MAHIDOL UNIVERSITY IN SUPPORT OF THAI RED CROSS CHILDREN HOME VILLAGE

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Abstract - The collaboration between faculties/institutes and Thai Red Cross Children Home Village in Nakhon Pathom Province, was an attempt to improve the project bestowed on Mahidol University by Her Majesty the Queen since 2011, via Golden Jubilee Medical Center (GJMC), for 30 orphans and neglected in aspect of healthcare knowledge and services. One of collaboration measurements was structural equation model (SEM), a technique of factor analysis (FA), which this study used as confirmatory FA with the objectives of learning the collaboration level and obtaining feedbacks to build a model for further integration of an academic sector into the village. The methods consisted of questionnaires translated into Thai from English Organizational Trust Inventory (OTI), tested for internal consistency and distributed to 24 participating representatives of 5 faculties/institutes and the village administrator after 6 months of the project implementation during 2017-2018, and the focus group interview of 9 surrogate mothers and aunts towards the end of the year. The SEM described the relationship between intangible factors: collaboration and 5 dimensions, namely, governance, administration, autonomy, mutuality and norms, and 56 questions in Likert scale from 1 = least agreeable to 5 = most agreeable. The interview focused on open-ended questions to gather general ideas and comments on the collaboration with the university. The response rate was 95.8% while Cronbach' alpha total 0.936. Model fit indices like ML, RMSEA, etc. did not reject the null hypothesis, even though the trends looked good, similar to previous works. The average scores were 72.9% and the interview resulted in the shared goals - help the children find their own life purpose and thrive to their best while immune to global dynamic changes. The proposed model of integration were depicted with improvement issues like ICT infrastructure for information flow and annual report to Thai Red Cross Society. Suggestions were made about FA consideration in healthcare researches to understand healthcare more deeply beyond the physical dimension and collaboration as an integral in integration of an academic sector into a community.

Keywords - Collaboration, Structural Equation Model, Integration, Thai Red Cross Society, Mahidol University, Golden Jubilee Medical Center.

I. INTRODUCTION

By virtue of Her Majesty the Queen, Thai Red Cross Society has established a children village for 30 orphans and the neglected aged 5-12 years old at Tambon Boplub, Muang District, Nakhon Pathom. Since 2011, Golden Jubilee Medical Center (GJMC) has been assigned by Mahidol University to collaborate among faculties/institutes in developing the village in aspect of child health, care giving, environment and administration. Key activities included physical and dental check up, illness treatment, parenting education, psychological assessment, child growth and development and nutrition counselling. The faculties/institutes: GJMC, Maha Chakri Sirindhorn Dental Hospital, Faculty of Medicine Siriraj Hospital, Faculty of Medicine Ramathibodi Hospital, Contemplative Education Center, National Institute for Child and Family Development and The Institute of Nutrition, have contributed their expertise for the village. Such collaboration certainly benefits the children and should it be systematically analysed, could be further developed into a model of integration of both a community and academic sectors to solve contextual problems. From a number of literature reviews on collaboration, one definition is "a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions"(Thomson AM, 2007).Thomson AM et al supported the theory and structural model of collaboration and 5 dimensions: governance, administration, autonomy, mutuality and norms. The Organizational Trust Inventory (OTI) is a survey consisting of 56 questions to measure these 5 dimensions plus the factor via 7-tiered Likert scale (Thomson AM, 2007). The Likert scores were calculated in structural equation model (SEM) for evaluation of collaboration among the faculties/institutes and the community. Factor analysis (FA) has been a technique widely used in social science researches; researchers frame a variety of models of unmeasured or latent factors of interest such as intelligence, personality, educational success and expertise, mental illness, social fear and concern, etc. to understand them quantitatively in more concrete form. Thus a data set of measured variables like Likert scores could reflect indirectly the

unmeasured factor or variable as collaboration. This concept is essential in FA which comprises exploratory and confirmatory FA. The former is used when the researcher at first does not have any data while the latter is used to confirm the proposed structural model. This study used CFA to support the model fit and explained the relationship between measured and unmeasured variables from the previous works - collaboration consists of 5 dimensions: governance, administration, autonomy, mutuality and norms (Fig.1) (Thomson AM, 2007). Two parts of the SEM are measurement and structural models with which Likert scores could be tested for component and overall fits, thus evaluating the level of collaboration.

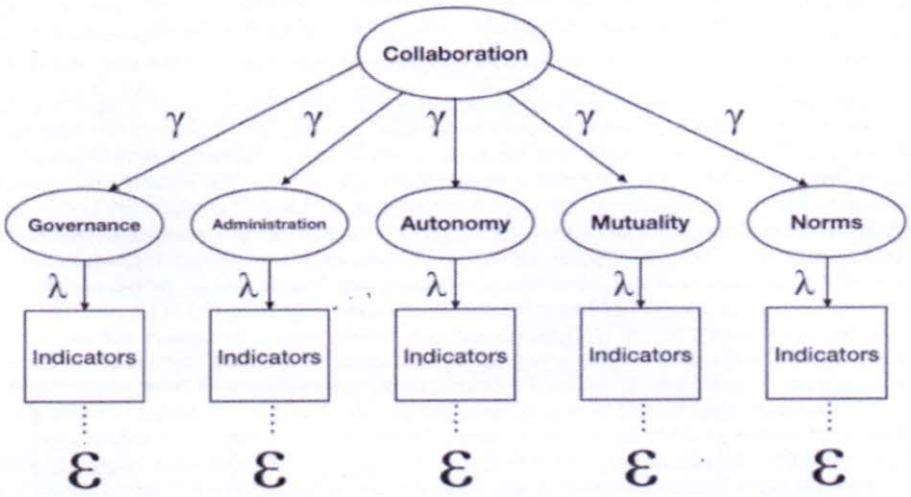

Fig.1. Factor analysis by structural and measurement models in depicting the relationship (gamma, lambda) between collaboration (unmeasured factor) and indicators (measured variables) via questions with possible errors (epsilon)

Objectives:

1. To measure the collaboration among the faculties/institutes of Mahidol University andthe village.
2. To obtain data for a model of integration betweenthe community and the academic sector.

II. DETAILS EXPERIMENTAL

2.1. Materials and Procedures

The proposal was approved by the IRB and the English version of OTI was translated into Thai and back for a comparison of consistent contents. The questionnaire consisted of 5 dimensions with 56 questions and 1-5 Likert scale. The scores were analysed for normality distribution (Korkmaz S, 2019). The internal consistency of the translated version was tested with Cronbach's alpha, focusing on 17 significant questions from the previous work of Thomson et al. After 6 months from the first meeting and the project implementation, the questionnaires in paper were distributed to all participating representatives of collaborating faculties/institutes. Response rate was noted and scores were analysed with IBM@SPSS version 23 and Lavaan in RStudio ver 1.1.463 in terms of model fitat $p < 0.05$ and 90%CI (CFA, 2019)(Finch, Jr WH, 2015)(Kelley K, 2011). Towards the end of the project year surrogate mothers and aunts were interviewed in a focus group with open-ended questions like general ideas about the project, level of the collaboration, activity outcomes, and so on.

III. RESULTS AND DISCUSSION

Twenty-four representatives of the 5 faculties/institutes received the translated questionnaires and all responded but one (95.8%). The scores were tested to have Cronbach's alpha total 0.936 (Table 1.) The highest scores were in 5 questions: G1(Governance), G2, G6, G9 and AU6 (Autonomy) while the lowest in only N2 (Norms). The score distribution of 17 questions was skewed.

Table 1. Validity and reliability of the translated questionnaire.

Case Processing Summary

		N	%
Cases	Valid	23	100.0
	Excluded[a]	0	.0
	Total	23	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.936	54

Model fit indices: RMSEA, CFI, TLI, AIC and BIC including factor loadings were estimated to imply significance (Table 2.).

Table 2. Model fit indices: RMSEA, 90%CI , AIC and BIC (the less, the better), CFI (the more, the better)

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lavaan 0.6-3 ended normally after 56 iterations

  Optimization method                           NLMINB
  Number of free parameters                         44

  Number of observations                            23

  Estimator                                         ML
  Model Fit Test Statistic                     293.321
  Degrees of freedom                               109
  P-value (Chi-square)                           0.000

Model test baseline model:

  Minimum Function Test Statistic              469.710
  Degrees of freedom                               136
  P-value                                        0.000

User model versus baseline model:

  Comparative Fit Index (CFI)                    0.448
  Tucker-Lewis Index (TLI)                       0.311

Loglikelihood and Information Criteria:

  Loglikelihood user model (H0)               -390.635
  Loglikelihood unrestricted model (H1)       -243.975

  Number of free parameters                         44
  Akaike (AIC)                                 869.271
  Bayesian (BIC)                               919.232
  Sample-size adjusted Bayesian (BIC)          783.067

Root Mean Square Error of Approximation:

  RMSEA                                          0.271
  90 Percent Confidence Interval          0.234  0.309
  P-value RMSEA <= 0.05                          0.000

Standardized Root Mean Square Residual:

  SRMR                                           0.194

Parameter Estimates:

  Information                                 Expected
  Information saturated (h1) model         Structured
  Standard Errors                             Standard
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Factor loadings, covariances and variancesbetween the dimensions and the questions were also estimated. Issues and sample questions of the focus group interview were in Table 3.

Table 3. Issues and sample questions in the focus group interview.

Issues	Sample Questions
1. Collaboration among faculties/institutes	- Up till now, what faculties/institutes of Mahidol University have come to help the village besides Golden Jubilee Medical Center?
2. Collaboration between Mahidol University and the village	- How any advice from the staff goes with your experiences?
3. Role and responsibilities of each faculty/institute	- Various entities have come to help the village, how clear are their roles and responsibilities? Any overlapping? - What are other sources of help besides Mahidol University? What kind of help?
4. Shared information among faculties/institute and the village	- What's the idea about children's information being studied and reported to Thai Red Cross? - Any burden? - Should the university provide a communication channel eg. hotline, what's the idea about this? - Should the university help measure or evaluate based on academic theory, what's the idea about this?
5. Change of external factors	- Amid globalisation, any other role of the university suggested?
6. Quality of life of children	- To what extent the village received the development evaluation results? - How are the results of an individual child before reporting to Thai Red Cross consulted with the faculties/institutes? - How's the teenage problem consulted and developed the practice guideline?

Working in a healthcare sector and being familiar with biomedical researches which almost all use quantitative analytic methods, we have been interested in the work of Thomson et al, especially the use of SEM in quantifying the intangible factor, collaboration, by relating it with measured variables, namely 56 questions of 5 dimensions. We tried CFA and selected their best model with only 17 significant questions to test with our sample data for a modelfit. At first, the original English questionnaire was translated into Thai and then the Thai version was independently translated back, compared and hence distributed as paper to all 24 representatives from 5faculties/institutes including the village administrator approximately 6 months after the first meeting and project implementation during the years 2017-2018. Regular activities were carried out as planned or as requested - annual check up and yearly growth development evaluation and teenage problem consultation respectively. The focus group interview took place towards the end of 1-year period of the project, obtaining feedbacks from all 9 surrogate mothers and aunts on the ongoing collaboration, specifically from Mahidol University. Therefore, to measure the collaboration, the Likert scores were calculated for internal consistency for evaluation of validity and reliability of the tool - very high Cronbach's alpha total of 0.936. Beaujean recommended a test for normality distribution prior to model fit (Korkmaz S, 2019) and we found that some of the scores from selected questions skewed either to the floor or ceiling values. For example, the question M12 skewed to the highest "5", " Partner organisations (including your organisation) work through differences to arrive at win–win solutions?". Or the question AU2: "Your organisation's independence is affected by having to work with partner organisations on activities related to the collaboration?" skewed to the lowest "1". The representatives might be biased and tend to answer towards "should" think, feel and do instead of "do" think, feel and do. Some question was sensed to ask negatively like the question AU1: "The collaboration hinders your organisation from meeting its own organisational mission?", so that it should be considered to have wording reversal like " The collaboration conforms with your organisation in meeting its own organisational mission?". It was a point when calculating for the convergence of measured variables. Statistically considered, the estimator ML of 293.321 and p-value for Chi-square 0.000 while RMSEA 0.271, not less than 0.05 (Thomson AM, 2007), with very low p-value, the null hypothesis of model fit was rejected. The remaining indices: CFI, TLI, AIC, BIC and factor loadings were borderline in interpretation. Anyway, The scores averaged from 17 selected questions were acceptably 72.9%.

Thomson et al attempted to refine and support SEM for profound understanding of the relationship between collaboration and measured variables, focusing on measure errors in both measurement and structural model parts of the equation. They found among three alternative models, the best with 17 questions for component and overall fits, but failed at statistical significance including cross-validation of the model, despite a good tendency. It was described as weaknesses in low response rate (32%) and the truncated sample meaning only scores from the group inside the network (Thomson AM, 2007). Our data set was different in responders' assignments at the organisational level, very high response rate and participation of the target community in measurements. Should it be without FA, we might come up with plain average scores like mean or median. Therefore, to understand more depth and breadth of healthcare in terms of spiritual dimension and holistic care, we suggested FA be considered in any translational research.

Because the questionnaire result was a mere snapshot of the responders' perception at the time; errors in SEM of either measurement or structural models could be viewed as uncertainty from personal subjectiveness or situational influences including adaptive learning whereby the conditional probability theory was explicable (Giulio D'Agostini, 2003). For example, the decision probability to answer could be formulated as P(D) and P(D) may or may not equal to P(D|K); where D = decision, K = knowledge (Conditional probability, 2019). We suggested it be another approach in quantitative analysis of an abstract factor.

Observation during the focus group found the atmosphere at the beginning a bit tense; 9 interviewees kept quiet until trust was felt by shared goals of raising the children better and immune to global dynamics. All carers shared big ideas to help them find one's own purpose in life. Their expectation for academic consultation was still a need and not overlapping with roles of other involved organisations. The summary of the interview gauged the collaboration to some extent and called for on-going relationship between the village and the academic sector. The feedbacks contributed to a model for integration as proposed in Fig.1.

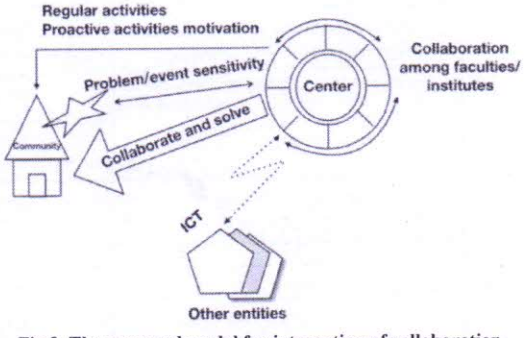

Fig.2. The proposed model for integration of collaboration between the village and the academic sector.

Since activities took place in both healthcare and academic services in either working hours or emergency, the model emphasised regular activities and promoting the village to hold their own for sustenance. For example, the village would send their children during summer vacation to supervise those of the staff at GJMC in return. GJMC, being the center for collaboration among participating faculties/institutes, acts as a frontline sensor and will assign any task according to each expertise. To be successful, knowledge management comes into play like mapping knowledge, retrieving and transferring it. Therefore the model also focused on information flow via effective technological infrastructure, especially for following annual results of growth and development evaluations and reporting to Thai Red Cross Society.

Collaboration is integral in integration of an academic sector into a community. The community-based participatory research (CBPR) of del Pino HE et al recognised community expertise on par with academic knowledge and involves community participation in every step of the research process as the principles (Homero E del Pino, 2016). Essential elements of CBPR were mutual respect, shared decision making, and a focus on measurable changes (effectiveness) in the community as a result of such research rather than research merely for hypothesis testing (efficacy). We agreed that to sustain for health outcomes in a community, their members should get involved in as many steps as possible, while the community, in line with the Lancet's Commission on Education of Health Professionals for the 21st Century, provided a context for academic programs. The CBPR challenged building the bridging structure on issues of shared set of community-academic health goals, inclusion of uniques insights of communities into health problems and trust between the two.

CONCLUSIONS

Collaboration between the community and academic faculties/institutes, once integrated, is one success factor in strengthening the cummunity to self-sustain. Mahidol University has diversity of expertise in healthcare as being bestowed an assignment for Thai Red Cross Children Home Village. To measure collaboration between faculties/institutes was the first objective of this study and by using SEM, the sample data did not fit well with the model proposed, even though the focus group interview revealed the process to be in a good trend. The qualitative results helped create an integration model between the village and the university including outside entities. FA should be considered further to link both quantitative and qualitative researches, upbringing other dimensions of healthcare than the physical one. The results of this study would be informed and presented to all who got involved.

ACKNOWLEDGMENTS

We thank our colleagues from all participating faculties/institutes of Mahidol University who provided love and care for the children in Thai Red Cross Children Home Village throughout the project period during which it was implemented. We were grateful to Kanyaphak Ng-erninta, Academic Research and Services staff for assistance with statistical tests and Masmolee Jitwiriyatham, also Academic Research and Services staff for comments that greatly improved the manuscript.

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