

A Confirmatory Factor Analysis of Promotion of Enjoyment of Learning in High School Students

¹Songsak Phusee-Orn and ²Frances Martin

¹Faculty of Education, Mahasarakham University, Thailand

²School of Psychology, Tasmania University, Australia

Abstract: The aim of this study is to investigate factors, which promote the enjoyment of learning in high school students. The participants consisted of 331 grad 10-12 students, ranging in age from 16-18 from government and private high schools and colleges in the second semester of academic year 2007, obtained using the multi-stage random sampling technique. The research instrument used was a rating scale Questionnaire, with α -coefficient = 0.97. The data analysis employed descriptive statistics and CFA. The result of this study revealed that the weights of the nine factors involved in the promotion of enjoyment of learning ranged from 0.61-0.90 at the 0.01 level of significance. The component weights were in the following order from the highest to the lowest weight: school management, instructional management, teacher's characteristics, students' support, student, living with others, community, family and friends with component weights of 0.90, 0.89, 0.87, 0.84, 0.78, 0.76, 0.68, 0.67 and 0.61, respectively. The most significant component was school management in term of importance. There was the goodness of fit index between the model and the empirical data with Chi-square (χ^2) of 2546.97, $p = 0.66$ at an degree of freedom (df) of 2578, GFI = 0.83, AGFI = 0.75, CFI = 1.00, SRMR = 0.061, SMSEA = 0.00 showing that the model had a construct validity.

Key words: Enjoyment, learning, enjoyment of learning, promotion of enjoyment of learning, confirmatory factor analysis, high school students

INTRODUCTION

Learning and teaching in the classroom not only focused on the students competency and morality but also happiness during studying. These three characteristics were being competent, should occur in students at the same time, which would support good and efficient learning. As a result, the quality of human resource would be affected in the future.

In order to encourage the students could study happily, it was very necessary to know that which factor supporting and promoting the enjoyment of learning would be composed of including, which component and indicator and which one was important much or less. It would be important matter for planning and designing various processes in order to promote the students for enjoyment learning. So, it was the cause of this study.

Research objective: To analyze confirmative factors for promoting the senior high school student's enjoyment learning: a case study of Australia.

Conceptual framework: In presenting, the conceptual framework of this study, Phusee-Orn and Ruengtip (2007)

study titled development of Indicator promoting the Level 4 students' enjoyment learning under the office of Udon Thani Educational Service Area 4 was applied by developing the indicator promoting enjoyment learning with students-based study. That study developed the indicator from documents and related study, the students responding the open-ended questionnaire, the students group's focus group discussion, investigation by the experts and factor analysis, found that there were 87 indicators enhancing enjoyment of learning, grouping into nine factors including: family aspect, friend aspect, community aspect, student aspect, teachers' characteristic aspect, school management aspect, instructional management aspect and living with the other aspect and students support aspect.

MATERIALS AND METHODS

Sample: The sample of this study were 331 students studying in senior high school (Grade 10-12) during the second semester of 2007 school year in schools and colleges in Tasmania city, Australia. They were selected by multi stage random sampling from schools under jurisdiction of public and private schools including small, medium and large sized schools.

Research instrument: The research instrument of this study was the questionnaire as 5 level rating scale adapted from Phusee-Orn and Ruengtip (2007), questionnaire of indicator for enjoyment of learning. The conceptual framework was developed for constructing the instrument from document and related study as well as responding from the open ended questionnaire of 336 level 4 students from small, medium and large sized schools. Then, the indicators were selected for being the item questions in questionnaire by focus group discussion. The students were assigned into 5 groups, 7 students each group, total of 35 students, based on 5 major indicator frameworks. Later on, the content validity of indicators was investigated by 33 experts including the supervisors and classroom teachers of level 4 students. Then, the confirmatory factors were investigated by collecting data from 590 students studying in level 4 from small, medium and large sized schools. It was found that there were 87 confirmatory indicators and 9 factors.

So, the researcher used the findings from the analysis of confirmatory factors as framework in developing questionnaire for data collection by translating the question items into English language. Then, the correctness and congruence with the context of Australia were investigated by 2 experts including:

- Jane Watson, Department of Mathematics Education, Faculty of Education, Tasmania University
- Greg Cairnduff, Short Course and Study Tour International Services, Tasmania University

The researcher improved and revised the items to be more appropriate. Later on, the instrument was tried out with 32 senior high school students (grade 10-12) in Tasmania city. Its quality was analyzed, found that there was reliability coefficient for 0.97 based on Cronbach's α -coefficient.

Data analysis:

- For basic information, it was analyzed by calculating the mean (\bar{X}), Standard Deviation (SD), Skewness and Kurtosis
- For confirmative factor, it was analyzed by considering the following statistics: Chi-square (χ^2), GFI, AGFI, CFI, SRMR and RMSEA

RESULTS

The findings of confirmative factor, found that the factor promoting the Senior High School Students enjoyment of learning: a case study of Australia including

Table 1: Factor loading of factor enhancing students enjoyment of learning

Factors	Factor loading	R ²
A: Family factor	0.67**	0.45
B: Friend factor	0.61**	0.37
C: Community factor	0.68**	0.47
D: Student factor	0.78**	0.60
E: Teacher's characteristic factor	0.87**	0.75
F: School management factor	0.90**	0.81
G: Living with the others factor	0.89**	0.80
H: -----	0.76**	0.57
I: Student' support factor	0.84**	0.70

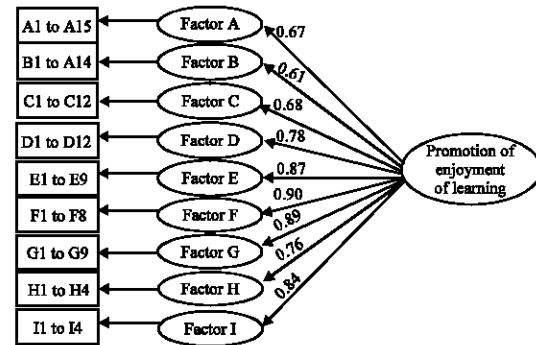


Fig. 1: The validity and empirical data

9 factors including: school management factor, instructional management factor, teacher's characteristic factor, student's support factor, student factor, living with the other factor, community factor, family factor and friend factor. Factor loadings were 0.90, 0.89, 0.87, 0.84, 0.78, 0.76, 0.68, 0.67 and 0.61, respectively. Every factor loading was significant at 0.01 level as shown in Table 1.

The findings of congruent test between the model and empirical data found that the $\chi^2 = 2546.97$, $p = 0.66$, $df = 2578$, $DFI = 0.83$, $AGFI = 0.75$, $CFI = 1.00$, $SRMR = 0.061$, $RMSEA = 0.00$, indicating that the model consisted of construct validity and it was congruent with empirical data as Fig. 1.

The findings of confirmatory factor considered by following factors.

Family factor: According to the findings of confirmatory factor, found that the family factor including 15 indicators, factor loading were from 0.33-0.73, everyone was significant at 0.01 level. The coefficient of determination values (R^2) were from 0.11-0.54. The variable with maximum value of factor loading was the forgiving for students when they did something wrong: A10 (factor loading = 0.73**, $R^2 = 0.54$).

The findings of confirmatory factor analysis for model measuring the family factor, found that there was goodness of fit index between the model and empirical data, considering from Chi-square (χ^2) value = 50.56, probability value $p = 0.75$ at degree of freedom (df) = 58 and RMSEA value = 0.000.

Friend factor: According to the findings of confirmatory factor, found that the friend factor consisted of 14 indicators, the factor loadings were from 0.29-0.75, everyone was significant at 0.01 level. The coefficient of determination values (R^2) were from 0.08-0.57. The variable with maximum value of factor loading was that the friend didn't ignore them when they faced their problems: B6 (factor loading = 0.75**, R^2 = 0.57).

For the findings of confirmatory factor analysis for model measuring the friend factor, found that there was goodness of fit index between the model and empirical data, considering from χ^2 = 39.92, p = 0.79 at df = 48, RMSEA = 0.000.

Community factor: According to the findings of confirmatory factor, found that the community factor consisted of 12 indicators, factor loadings were from 0.57-0.77, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.34-0.60. The variable with maximum value of factor loading was the community people were role model for the youngsters: C3 (factor loading = 0.77**, R^2 = 0.60).

For the findings of confirmatory factor of model measuring community factor, found that the model was goodness of fit index between the model and empirical data, considering from χ^2 = 18.79, p = 0.76 at df = 24 and RMSEA = 0.000.

Student factor: According to the findings of confirmatory factor, found that the student factor consisted of 12 indicators, factor loadings were from 0.49-0.75, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.24-0.57. The variable with maximum value of factor loading was that the students were diligent and enthusiastic in studying: D3 (factor loading = 0.75**, R^2 = 0.57).

For the findings of confirmatory factor analysis of model measuring the student factor, found that there was goodness of fit index between the model and empirical data, considering from χ^2 = 13.98, p = 0.87 at df = 21, RMSEA = 0.000.

Teacher's characteristic: According to the findings of confirmative factor, found that the teacher's characteristic factor consisted of 9 indicators with factor loadings were from 0.31-0.76, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.10-0.58. The variable with maximum value of factor loading was that the teachers understood their students: E1 (factor loading = 0.76**, R^2 = 0.58).

For the findings of confirmatory factor analysis of model measuring teachers' characteristic, found that there

was goodness of fit index between the model and empirical data, considering from χ^2 = 5.33, p = 0.80 at df = 9, RMSEA = 0.000.

School management factor: According to the findings of confirmatory factor, found that the school management factor consisted of 8 indicators, factor loadings were from 0.21-0.79, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.04-0.62. The variable with maximum value of factor loading was that the school had natural and clean environment: F6 (Factor Loading = 0.79**, R^2 = 0.62).

For the findings of confirmatory factor analysis of model measuring school management factor, found that there was goodness of fit index between the model and empirical data, considering from χ^2 = 0.74, p = 0.69 at df = 2, RMSEA = 0.000.

Instructional management factor: According to the confirmatory factor, found that the instructional management factor consisted of 9 indicators, factor loadings were from 0.51-0.91, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.26-0.83. The variable with maximum value was the teaching was fun and wasn't too serious: G4 (factor loading = 0.91**, R^2 = 0.83).

For the findings of confirmatory factor analysis of model measuring instructional management factor, found that there was goodness of fit index between the model and empirical data, considering from χ^2 = 0.03, p = 0.87 at df = 1, RMSEA = 0.000.

Living with the other factor: According to the findings of confirmatory factor, found that the living with others factor consisted of 4 indicators, factor loadings were from 0.67-0.79, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.45-0.63. The variable with maximum value of factor loading was the positive emotion and not too serious: H₂ (factor loading = 0.79**, R^2 = 0.63).

For the findings of confirmatory factor analysis of model measuring the living with the others, found that there was goodness of fit index between the model and empirical data, considering from χ^2 = 0.12, p = 0.73 at df = 1, RMSEA = 0.000.

Student's support factor: According to the findings of confirmatory factor, found that the students' support factor consisted of 4 indicators, factor loadings were from 0.51-0.81, every one was significant at 0.01 level, the coefficient of determination values (R^2) were from 0.26-0.65. The variable with maximum value of factor

loading was the counseling, suggesting, warning for students who did something wrong with reasons factor: I3 (factor loading = 0.81**, $R^2 = 0.65$).

For the findings of confirmatory factor analysis of model measuring the students' support, found that there was goodness of fit index between the model and empirical data, considering from $\chi^2 = 0.13$, $p = 0.72$ at $df = 1$, RMSEA = 0.000.

DISCUSSION

According to the confirmatory factor analysis, found that the factors enhancing the students happy study consisted of 9 factors by considering the school management factor as the maximum factor loading. It was supported by Phusee-Orn and Ruengtip (2007), studying the secondary school students (level 4) in Udon Thani province found that the school management factor was the most important factor. It might be because of the school was the place where the students spent a lot of time each day. Therefore, if there was good management, the students would be pleased and happy for their studying and participating in various activities in school. Tileston (2007) stated that the atmosphere was important for learning. The teachers couldn't control other kinds of environment outside their classroom/school. But during 7 h of each day, they students spent their life in that school, we could manage good environment facilitating their learning. For the school without good management, the students would feel bad towards their school and weren't happy to live in. As a result, extra curricular activities needed to be managed there. It was supported with education extra's (Bold, 2004), found that in some schools, approximately 25% of them participated in volunteer activities outside their school. One reason was that they had negative attitude towards their school. Considering the analysis of each factor.

For family factor, the indicator with maximum value of factor loading was that, when the family forgave the students after they had done something wrong, which was important because if the family institute lacked of understanding for them, they wouldn't be happy for participating in various kinds of activities especially, their studying. Besides, during their learning age or adolescent, which was a period of curiosity. Consequently, they always shown their behaviour in a way of trial and error. Since, they lacked of experience, the mistaken might be frequently occurred. So, when their family forgave them and gave them another chance, it was the decrease of anxiety, which would support them to learn or participate in different activities without too much stress. They would be happy with their studying or participating those activities.

For friend factor, the indicator with maximum factor loading was that their friends didn't ignore them when, they were facing their problem. Since, the adolescents gave an importance to their friends and needed recognition from them. Therefore, if they didn't receive the acceptance or were neglected by their friends, they had to face their problem alone they wouldn't be happy in their living. Specifically, the life in school, which was on their studying as well. Nicholls (2004) suggested that the students would have their learning problem if they separated from their friends. But, learning would occur from studying together with the other students, interacting with their teachers and environment. When they shared and learned together, their skills would be improved in various things, for example, leadership, conflict management and decision making skill and etc.

For community factor, the indicator with maximum factor loading was the community people as the youths' role model. It might be because the community was an environment forming the students desirable characteristics. If they lived in strong community, development with role model people succeeding in community, they would be encouraged their learning, motivation and life goal as their role model. As a result, they would have their self esteem and happiness in studying in order to reach their goal. In many regions, the community played important role in educational management. Some of them could developed strength in education by developing Community College in enhancing lifelong learning for community people s a source providing education by community, for community and in community (Dowell *et al.*, 2006).

For the student factor, the indicator with maximum factor loading was that the students were diligent and enthusiastic in studying. When, they were enthusiastic to learn, they would always be happy with the things they had learned and found the new and unfamiliar things, their learning achievement would be improved and opportunity in succeeding would be high. Consequently, they would study happily.

For the teachers characteristics factor, the indicator with maximum factor loading was that the teacher understood their students. Happiness would be happened if they were interested in and understood by their teachers. Nicholls (2004) stated that the classroom atmosphere would significantly affect learning. Therefore, if the atmosphere was warm and full of teaches' understanding on their students, the students would alleviate their anxiety in one level. Moreover in case, the students did some errors, the teachers had to try to understand the occurred mistakes. Martin-Kniep (2000) stated that if the teachers were careful and warned about the students' former error, the opportunity in good learning would be happened.

For the school management factor, the indicator with maximum factor loading was that the school had natural and clean environment. Since, physical factor was one part affecting mental condition as well as happy study. If the place was dirty, untidy, no security, people who lived there wouldn't be happy to live in that place, which was the human beings' basic need.

For the instructional management factor, the indicator with maximum factor loading was that the teachers provided lively teaching and not too serious. Chesebro and McCroskey (2002) stated that the humor would be a teachers' tool for teaching so that the efficient teaching would be happened. It was supported by Chesebro and McCroskey (2002) suggested that when the students learned with teachers with humour, they would have their motivation in studying more, which would have good effect for participating in good things in class. For Nicholls (2004) concluded that the humorous was important for relationship between teachers and students. But, it should be used in an appropriate way.

For the living with the others factor, the indicator with the maximum factor loading was that the cheerful feeling and not too serious. The students could be able to live with the others without pressure both on themselves or the others. As a result, the anxiety would be alleviated. They would be happy and affected their learning/participation in activities with others happily. Tileston (2007) stated that to live with the others in classroom was important. The teachers needed to have techniques in allowing their students to know the other friends and feel as the group members. So, they would be happy for participating in different activities with their classmates.

For the student support factor, the indicator with maximum factor loading was that the reasonable counseling, suggesting and warning the students who did some errors. Consequently, the students would feel secure, relaxed and happy for participating in various activities in classroom. It was supported by Tileston (2007) that the teachers' role would be counselors suggesting and facilitating the students' opportunity to learn, which would affect their learning. Besides, Rudduck and Flutter (2004) also, suggested that the good teachers should provide honor for their students and paid attention to their suffering. They should be enthusiastic, optimistic, as well as made compliment rather than punishment for their students.

CONCLUSION

The factor enhancing the senior high school students enjoyment of learning in Australia, it consisted of nine

factors ranking in order by factor loadings from high to low including: school management factor, instructional management factor, teacher's characteristic factor, student' support factor, students factor, living with the others factor, community factor, family factor and friend factor.

RECOMMENDATIONS

According to the research findings, the implementation for enhancing the students' enjoyment of learning could be suggested, the related parts should be implemented as follows:

- The school environment should be managed to be clean and natural and facilitating learning by focusing on democracy in school. Modern classroom and laboratories should be provided to be ready for being used. The curriculum should be appropriately managed. The students should be provided opportunity in expressing their opinion and participating in school development
- The teachers needed to understand their students both in overall and individual. They should provide opportunities for their students in expressing their ideas during teaching. They shouldn't assign too much homework. They should encourage their students to be assertive, humorous, including atmosphere of pleasure, not too serious. They should have various and new techniques and instructional management. They should provide reasonable counseling, suggesting and warning for their students who did wrong. Moreover, field trip study should be managed for changing the learning climate as well
- The students had to pay attention to, be diligent and enthusiastic in learning, responsible for doing homework and assignment assigned by their teachers on time. They should adequately organized their time, have cheerful feeling, not too serious participating in different activities such as playing sports, listening to music, or playing with friends during leisure time, adjusting themselves with the others as well as taking care of themselves for good health
- People in community had to be good example for the youths, the students should have opportunities in expressing their ideas. The activities and useful learning resources should be managed for them as well as the instructional media and internet in the village should be supported and encouraged

- The family had to understand and be ready in forgiving the students if they did wrong by focusing on unity in family, listening to ideas, being trusted and confident, no verbal abuse or warning without reasons. They shouldn't have pessimistic on their children and had to understand the students as the adolescents
- The friends had to understand and didn't ignore the students when, they were facing problems. They should be friendly, generously and listened to problems and provided advices in every thing. They should have unity and be empathy. They should guide for lessons the students didn't understand, trust with each other and suggest them in a good way

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