Development of indicators of happiness in learning of Thai open university students

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Abstract

Purpose – This paper aims to develop indicators of happiness in learning of the Thai open university (TOU)'s undergraduate students.

Design/methodology/approach – Sampling for the study was comprised of two groups. Group I comprised eight lecturers who are experts in their disciplines and six students who were purposively sampled. The focus group was used to validate the appropriateness of the indicators. In Group II, 332 students were engaged in a multistage sampling process. The responses were analyzed using descriptive statistics, coefficient correlation, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

Findings – The indicators of happiness in learning of undergraduate students of TOU were classified in six categories. These included satisfaction with learning environment (five indicators), learning anxiety (five indicators), satisfaction with learning (five indicators), enthusiasm to learn (six indicators), self-satisfaction (six indicators) and readiness to learn (seven indicators). The six categories explained happiness in learning of undergraduate students of TOU at the 65% and fit empirical data.

Practical implications – The TOU can use the indicators for the assessment of happiness in learning of its students as well as guidelines for the improvement of its student learning environments.

Originality/value – There have been very few studies on indicators of happiness in learning of TOU students. Most were done at the basic education level. This study disclosed the six factors affecting happiness in learning of TOU students; therefore, it should inspire and draw attention of many in the field of higher education distance learning.

Keywords Happiness in Learning, Happy learning indicators, Learning indicators, Student learning, Thai open universities, Undergraduate students

Paper type Research paper

Introduction

Open universities offer education services through distance learning. Open universities make access to higher education of everyone possible with a variety of programs – both degree and nondegree. Most open universities employ various forms of learning technology allowing students to learn from home, offices or other places without requiring them to attend the class. Students learn through printed materials, audio cassettes, compact disc (CD) etc. Bordoloi (2018) found that open distance learning (ODL) offered the energetic grown-up population of a nation an elective path for making education accessible and for providing scope for skill-based education at minimum cost. Kruse *et al.* (2022) and Franklin *et al.* (1996) found that although distance learning was advantageous in a number of ways it also had a lot of limitations. For instance, students had no chance of receiving immediate feedback from their

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lecturers. They had little chance of practicing communication skills or receiving hands-on experience. Most open-university students faced problems of loneliness and lacked interaction skills with others. With these problems mounting, a few open-university students ended up with boredom, discouragement, program dissatisfaction, and consequently dropped out. The finding was in accordance with Bundasak *et al.* (2017) who found that students under stress were unhappy with learning and learned less, which was the cause of boredom and poor learning performance, and finally often dropped out.

Utami *et al.* (2020) found that student dropout was a continued issue in debate at both conventional and open universities world-wide. Radovan (2019) found "that the dropout rate in distance educational programs is higher than that of the conventional ones" (p. 29). Yılmaz and Karataş (2022) found that internal and external reasons caused the dropout. The most influential internal reasons, as provided by the students, were academic integration, social integration, resources and accessibility. The second level of influential reasons in dropping out from programs was external reasons, such as business life, financial reasons, family life and external obstruction. Guzmán *et al.* (2021) found "that a number of factors influenced dropout of rural higher education students; they are adaptation to the higher education institutions, Learning Management System, use of ICTs, course contents, self-learning, communication, family dysfunction, lack of job opportunities, absences from classes, dissatisfaction with the program, slow academic progress, personal goals, fear of failure, motivation, death of relatives, parents' educational level, nutrition problems, scheduling problems, relationship problems with parents, ethnicity, racism, poverty, knowledge recognition, academic failure, and transfer to another university" (p. 7). Choi *et al.* (2013) found that causes of dropout or the failure to complete the program within the time limit of most open-university students were due to the lack of communication between the students and the lecturer, too demanding job burden, difficulty in the learning system itself, too demanding course requirement, unfamiliarity with self-learning system. In addition, age, sex and educational backgrounds were also causes of dropout or failure to pursue their registration. Aydin *et al.* (2019) found "that unsatisfactory exam results, lack of knowledge about the open education system, unsuitability of the registered program, time management problems, interference of life routines on studies, and some personal problems were major causes of the dropout" (p. 40).

Higher education open universities are therefore advised to create happiness in learning among their students through different learning systems employed by the open-university and the conventional university.

Undergraduate students of Thai open universities are different in age, academic background, learning experience. Faced with the unfamiliar distance learning system, Open University students have difficulty adjusting themselves to the new learning environment. Particularly, the new learning environment requires them to learn through learning media as well as self-learning discipline. They need to be able to manage their daily activities and emotional needs for the achievement of their stated educational goals. As well, they need to adjust themselves to the educational services provided by the university such as educational media and academic services, which might lead to pressure and stress and consequently lead to unhappiness in learning. Suksawat (2020) found that the problem encountered by most Thai distance learning students, who were mostly adults during the pandemic of COVID-19, was the psychological problem. They observed changes in politics, economy, social media, social problems and crimes which made them depressed, stressed and anxious; and consequently led to dropout. Therefore, the university should create happiness in learning environment within the university. Bundasak *et al.* (2017) found that the dropout problem could be minimized through its learning management system, co-curricular activities, creating conducive physical learning environment, making supporting facilities available for content and skills learning. Happiness in leaning could attract learning interest and

enthusiasm and consequently led to higher academic achievement and desirable mental quotient.

Based on the literature reviewed, none had been done on happiness learning indicators of students of higher open-learning institutions. A number of studies had been conducted at the basic education level, but a very limited number at the higher education level. Srichai *et al.* (2021) studied factors affecting happiness in learning of Songkla University students; Chaowakeeratiphong and Wongnaya (2020) studied psychological factors affecting student's happiness in learning; Loonprom and Kensila (2018) studied factors related to the happiness level of nursing students at Ratchathani University Udonthani campus; Jaiboontan *et al.* (2018) studied the causal factors affecting undergraduate students' happiness in learning. The studies mentioned above mainly focused on factors affecting happiness in learning of conventional university students. None had been done on the indicators of happiness in learning of the Open University system.

As a faculty member of Sukhothai Thammathirat Open University (STOU), the researcher wonders what would be the indicators of happiness in learning of the students at her university, and is interested to develop indicators of happiness in learning of undergraduate students of the Open University in Thailand. With these concise, concretized, observable, implicative and appropriate indicators, the Thai open university can use them as a tool for the evaluation of the existing university learning design and make an improvement plan for better achievement of its students' learning and consequently help the students to attain true happiness in learning as well as academic success.

The purpose of this study is therefore to develop indicators of happiness in learning of undergraduate students of the Thai Open University (TOU). Specifically, what are the indicators of happiness in learning and how are these indicators categorized?

Happiness in open learning

Gunawardena and McIsaac (2004) found that the open education system was the system that admits students into its programs with no limitation in neither class-size nor admission criteria. The system offers unlimited access to postsecondary education to everyone. As well, the system uses various types of technology making education services accessible to students without requiring them to attend class. Students may learn through various types of media such as printed materials, audio cassettes, CD or any other learning media. The open education system, using distance learning, has gained its popularity around the world. However, in this 21st century Kruse *et al.* (2022) and Zuhairi (2019) found that with the advancement of digital technology, learners could access learning lessons from anywhere at any time through digital learning tools. Further, learners could receive lesson feedback from their lecturers promptly, which made online learning gain its popularity. The online learning made learning accessible for everyone. There was no limitation in class-size nor course fees unless the learner wished to gain course credits. The researcher observes that a number of online platforms have currently been introduced, such as MOOC (massive open online course) and open education resources. Moroz and Moroz (2022) found that a few instruments were used in online learning such as teleconferences, online lectures and learning material discussion in a chat-box or in a forum. The sum-total value of these instruments' significance in ensuring the distance education quality as evaluated by the students at 63%. Conventional open education therefore had been diminished and been replaced with online distance learning. Sungsri (2006), however, found a number of limitations of the open-learning system. These included (1) students had little opportunity to interact with their lecturers, (2) they lacked opportunity to interact with peers and felt lonely, (3) they were free to manage their learning time but mostly lacked learning discipline, (4) they became discouraged when faced with difficult to understand and complicated learning tools, and (5) the delayed

communication between the institute and the students caused boredom, discouragement and dissatisfaction with the system.

The literature shown that most open university students faced with a number of personal problems which include loneliness, depress, stressfulness and anxiety and consequently led to low learning motivation and dropout.

There have been a number of learning theories introduced. Maslow (1954) proposed the hierarchy of needs which stated that once human needs were fulfilled, human beings would be happy. His hierarchy of needs was divided into five hierarchies which included (1) basic, (2) safety, (3) loving, (4) recognition and (5) self-fulfillment. DePoy and Gilson (2008) used the need hierarchy of Maslow's but extended into eight hierarchies which included (1) physiological, (2) security, (3) acceptance, (4) self-esteem, (5) knowledge and understanding, (6) aesthetics/beauty, (7) self-actualization and (8) transcendental. The teacher or the learning facilitator needs to know fundamental needs of her learners so that she can fulfill learning needs of her learners accordingly. The teacher/lecturer can use the students' needs to motivate their learning. They further elaborate that learners can learn better if they feel free to learn and that the learning environments are conducive. However, if the learners' fundamental needs are not fulfilled, learners will have low motivation to learn which consequently impedes their learning.

According to learning motivation theories mentioned above, students learn better if their needs are fulfilled and they feel happy to learn.

Concepts about happiness in learning. The aim of education is to produce healthy – physically and emotionally – citizens so that they could live their life happily. The teacher needs to play a key role in helping and making the students healthy. She needs to create happy learning environments in the school. The relaxing environments need to be created. The environments need to attract, persuade, include and involve every student in learning activities. The teacher needs to understand and accept individual differences of her students so that they can maximize their learning potential. Ivanova and Dimova-Severinova (2021) studied "the role of happiness in applying suggestopedia and fostering the language learning process", and found that all learning experiences, regardless of the processes and methods used, "as indicated in the report, would be much more efficient if conducted in a positive environment where learners experience joy, happiness, and positive emotions as part of the learning process" (p. 378). Moussa and Ali (2022) explored the relationship between academic success and happiness levels of students in higher education settings during the lockdown period of COVID-19 and found that "the students' levels of happiness were positively correlated with their academic success. Thus, happiness was found to be able to predict students' success, the more the levels of happiness increased, the higher the students' academic success. The high level of happiness that participants achieved affirms the importance of the happiness achieved. The UAE's Ministry of Happiness and Welfare believed that happiness was a pursuit for individuals and thus explained and confirmed the importance of the efforts made to achieve a high level of well-being and academic success" (pp. 1003–1004). Happiness in learning is a learning environment that should be created. The happy learning environment can bring about learning motivation and enthusiasm which consequently leads to higher learning achievement. Also, it can bring about desirable mental health of our learners.

How to measure learning happiness is the question that is worth investigation. To be able to measure happiness in learning, happiness learning indicators need to be developed.

Kanjanawasee (2021) and Johnstone (1981) concluded that "indicator" is something that indicates the state of a thing that we want to measure – quantitatively and qualitatively at a particular time. The thing that we measure shall be in the form of observable numeric figures, variables or any other element that can be used for comparison with the stated criteria. Kanjanawasee (2021) proposes that the "good" indicator should carry (1) validity – can

measure what it wants to measure and correlates directly with what it intends to measure, (2) reliability – can reveal the true characteristics of the thing it is measuring reliably, (3) neutrality – intend to measure with neutrality and not to lean on any side, (4) sensitivity – be sensitive to the thing it wants to measure and reveals variation and differences in what it is measuring, and (5) practicality – be practical and useful.

In this study, to assure the "good" and validity of the constructed indicators of learning happiness, a review of related literature was conducted. Data, quantitative and qualitative, were collected from all stakeholders involving in the delivery of distance learning programs of undergraduate students at STOU, including students themselves. The focus group was used to select the best fit indicators. The exploratory factor analysis (EFA) and the confirmatory factor analysis (CFA) were used with quantitative data.

Methodology

Research informants and samples

The selected informants and samples were purposely selected and divided into two groups.

(1) The key focus group informants for the verification of indicators of each happiness learning element were divided into 2 groups which included (1) two senior experts in higher education who had experience in indicator development and six lecturers with at least five years of lecturing experience at an open higher education institution and (2) six students who enrolled in the undergraduate programs of the university at the time of the study. The two groups were purposely sampled. The focus group of students was conducted separately from the group of senior experts and lecturers to avoid influence in expressing ideas towards the issue of individual informants. The guideline questions for the focus groups were developed by the researcher under the advice of learning experts. Each focus group was conducted at the university and lasted in about three hours.

(2) The questionnaire respondents were 332 undergraduate students who were enrolling in the 2021 programs at STOU. In this research, only undergraduate students who enrolled in the 2021 academic year in the distance learning programs at STOU, the open higher education institution, within the 11 programs were included. These programs were Liberal Arts, Communication Arts, Educational Studies, Management Science, Law, Economics, Political Science, Agriculture and Cooperatives, Human Ecology, Health Science, and Science and Technology. The size of the sample was more than 300 which was considered a "good size" for EFA and CFA as affirmed by Comrey and Lee (1992) and Tabachnick and Fidell (2013). In this study, the sample size of 332 was therefore suitable. Samples were drawn through multistage random sampling. In stage 1, the 12 academic programs were selected. In stage 2, 332 students from the 12 academic programs were proportionately and simple randomly sampled.

Materials and tools

The tool for this study was a set of questionnaires for the development of happiness learning indicators, which were the 35 indicators developed by the researcher through a comprehensive literature review, a synthesis of the reviewed happiness learning indicators, and the validation of the synthesized indicators by the learning experts and students of the two focus groups. Particularly, the learning experts helped in validating and categorizing the groups of indicators. The questionnaire comprised two parts – (1) personal data which covered six checklist and fill in space items and (2) the degree of happiness in learning of the respondents which was the five Likert rating scale covering six dimensions of

happiness in learning including eight items in readiness to learn, six items in self-satisfaction, five items in satisfaction with learning, six items in enthusiasm to learn, five items in learning anxiety and five items in satisfaction with learning environment. The IOC (item objective congruence) value of all items ranged between 0.67–1.00, which was higher than the acceptable 0.50 level as recommended by Rovinelli and Hambleton (1977), and was selected. The Cornbach's alpha method for testing of reliability efficiency was used. The reliability of the questionnaire was 0.90 and the reliability of each dimension of the happiness in learning ranged between 0.86 and 0.96; which, according to George and Mallery (2010), meant that the reliability of the questionnaire was at the "very good" level.

Data analysis

The EFA and the CFA were used in the analysis of the quantitative data. The oblique rotation was also specially used. The rotations of each axis are not rectangular nor independent from each other. The oblimin rotation technique was also used in rotating the axis. Only the suitable factors were selected following the rotation. Criteria for the selection of the factors were: (1) each factor carried the eigenvalue higher than 1 (Kaiser, 1960), (2) each factor in the learning happiness dimension carried factor loading higher than 0.30 (Lu and Marlow, 1999; Kim and Mueller, 1978), (3) each factor carried explanatory variables of at least three variables (Kim and Mueller, 1978) and (4) the R programming was used in labeling of the selected factor.

Findings

The findings were as follows.

(1) It was found that, through the focus group verification, the happiness learning indicators were suitable. Only a few items were adjusted according to suggestions of the focus group participants. This assured the suitability of the indicators. The indicators were then classified into six dimensions and 35 indicators. These included readiness to learn which comprised eight indicators, self-satisfaction comprising six indicators, satisfaction with learning comprising five indicators, enthusiasm to learn comprising six indicators, learning anxiety comprising five indicators and satisfaction with learning environment comprising five indicators.

(2) By using EFA, the learning indicator development was divided into four steps**:**

- By using descriptive statistics which included mean **(**M**)**, standard deviation (SD**)**, skewness **(**Sk**)**, and kurtosis **(**Ku**)** in the analysis of EFA indicators, the structure and distribution of the indicators were shown in Table 1.
- Through the verification of the suitability of the 35 EFA indicators by using Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin **(**KMO**)** measure of sampling adequacy, it was found that the Bartlett's Test of Sphericity = 9287.48, df = 595 and p = 0.00. This indicated that the matrix correlation between indicators differed significantly from the identity matrix with the KMO = 0.94 which was greater than 0.60 (Hoque *et al.*, 2018). It further explained that the variables used in the development of happiness in learning indicators were closely correlated. It was therefore suitable for further factor analysis.
- Through the analysis of communalities, it was found that the communality (h^2) value of every indicator, except one, ranged between 0.42 − 0.82 which was greater than 0.25 (Beavers *et al.*, 2013) indicating that every indicator could be used for the measuring of common factors. The indicator with highest

Indicator	M	SD	Sk	Ku	h^2
Readiness to learn					
1. I feel relaxing once physical health does not impede learning	4.44	0.79	−1.70	3.63	0.24
2. I feel ready to learn once I have sufficient academic backgrounds to learn	4.14	0.77	−0.65	0.27	0.47
3. I am happy to gain skills to search for new knowledge beyond what I can learn from the text	4.19	0.72	−0.44	−0.45	0.50
4. I don't feel bored to comprehend important concept of what I read	3.94	0.77	−0.49	0.47	0.59
5. I feel ready to learn since I have sufficient budget for learning	4.02	0.88	−0.70	0.23	0.43
6. I am self-confident in the new learning environment, particularly in adjusting myself to group work and participation	4.21	0.77	−0.90	0.96	0.57
7. I am very pleased to receive moral support from the family	4.33	0.77	−1.06	1.00	0.47
8. I am enthusiastic to learn once I receive financial support from my family at the time in need	4.10	0.90	−0.96	0.79	0.42
Self- satisfaction					
9. I accept my own competence	4.23	0.74	−0.62	−0.22	0.61
10. I am confident that my personal characteristics are suitable with the open-university distance learning system	4.20	0.72	−0.62	0.41	0.62
11. I feel that I am valuable as compared with others	4.22	0.72	−0.61	0.02	0.58
12. I love and be proud of myself	4.44	0.72	−1.23	1.46	0.71
13. I am satisfied that I have learned what I like and that what I wish to learn	4.43	0.72	−1.29	2.04	0.64
14. I am satisfied with my academic performance	4.20	0.81	−0.75	−0.09	0.72
Satisfaction with learning					
15. I am satisfied with cooperative activities between the lecturer and the students and also among students ourselves	4.10	0.85	−1.02	1.47	0.69
16. I am satisfied with my lecturer	4.14	0.81	−1.03	1.77	0.74
17. I am satisfied with my colleagues	4.10	0.79	−0.63	0.23	0.68
18. I am satisfied with assessment techniques used by the university, particularly the mid-term exam together with student participation activities	4.11	0.81	−0.91	1.24	0.73
19. I am satisfied with the curriculum management, particularly the arrangement for student-lecturer contact	4.03	0.82	−0.91	1.21	0.73
Enthusiasm to learn					
20. I feel relax and happy to learn	4.04	0.81	−0.69	0.57	0.71
21. I am enthusiastic to learn	4.15	0.77	−0.58	−0.22	0.78
22. I try hard to learn even though it is a difficult subject and I never give it up	4.19	0.74	−0.58	−0.13	0.72
23. I enjoy self- learning and wish to learn new things	4.19	0.76	−0.63	−0.17	0.75
24. I love listening, speaking, reading and writing	4.06	0.81	−0.73	0.62	0.67
25. I discipline myself for self-learning	3.99	0.87	−0.69	0.35	0.69
Learning anxiety					
26. I feel lonely in learning due to the lack of classmates	3.07	1.19	−0.16	−0.72	0.74
27. I feel anxious about learning due to the lack of higher education distance learning skills	3.27	1.26	−0.27	−0.89	0.79
28. I feel stressful and pressured when I cannot finish my texts before the exam date	3.50	1.17	−0.42	−0.65	0.61
29. I feel bored with the required curriculum activities	2.88	1.13	0.03	−0.70	0.64
30. I feel exhausted when the exam result does not come out as expected	3.34	1.25	−0.28	−0.91	0.70
Satisfaction with learning environment					
31. I am satisfied with the university learning media and materials	3.89	0.89	−0.89	0.93	0.70
32. I am satisfied with the university learning resources, particularly textbooks, journals and digital learning sources	3.88	0.90	−0.75	0.52	0.77
33. I am satisfied with the university academic services, particularly the remedial learning services	3.97	0.91	−0.89	0.71	0.82
34. I am satisfied with the university guidance and counseling services	3.96	0.93	−0.84	0.60	0.73
35. I am satisfied with other university academic services that facilitate learning, particularly the radio and TV broadcasting	3.98	0.88	−0.83	0.72	0.75

Source(s): Table created by author

Table 1.
Descriptive statistics and commonality of the indicators

communality value was the 33rd indicator followed by the 27th indicator. But the communality value of the 1st indicator = 0.24 was less than 0.25 and thus could not be used for the measuring of the common factor and was removed from the analysis as shown in Table 1.

For the scree plot graphic presentation showing Eigenvalues of each indicator ranging from highest to lowest indicating that the Eigenvalues of the six dimensions were greater than 1. This explained allowed us to summarize the indicators into six dimensions as shown in Figure 1.

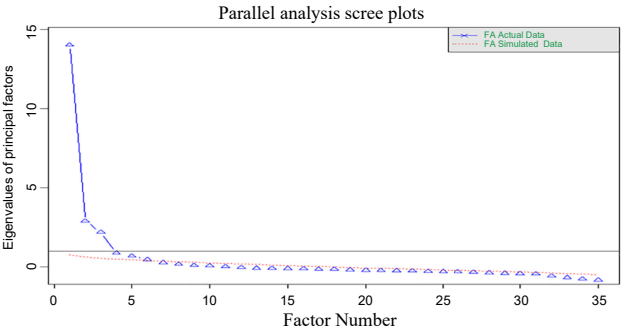
- Through the EFA, the researcher found that there were six factors and 34 indicators that had effects on learning happiness. They were as following.

Factor 1 - Satisfaction with learning environment: The factor loading of this factor ranged from 0.80 to 0.90 which were supported by five indicators. The indicators with highest to lowest factor loading were 33rd, 32nd, 34th, 35th, and 31st, respectively. The five indicators altogether contributed to satisfaction with learning environment with the eigenvalue = 4.32 and this factor contributed to happiness in learning with the weight of 12%.

Factor 2 - Learning anxiety: The factor loading of this factor ranged from 0.77 to 0.90 which were supported by five indicators. The indicators with highest to lowest factor loading were 27th, 26th, 30th, 29th and 28th, respectively. The five indicators altogether contributed to learning anxiety with the eigenvalue = 3.52 and this factor contributed to happiness in learning with the weight of 10%.

Factor 3 - Satisfaction with learning: The factor loading of this factor ranged from 0.67 to 0.79 which were supported by five indicators. The indicators with highest to lowest factor loading were 15th, 18th, 16th, 17th and 19th, respectively. The five indicators altogether contributed to satisfaction with learning with the eigenvalue = 4.17 and this factor contributed to happiness in with the weight of 12%.

Factor 4 - Enthusiasm to learn: The factor loading of this factor ranged from 0.46 to 0.76 which were supported by six indicators. The indicators with highest to lowest factor loading were 21st, 23rd, 22nd, 24th, 25th and 20th, respectively. The six indicators altogether contributed to enthusiasm to learn with the eigenvalue = 4.40 and this factor contributed to happiness in learning with the weight of 13%.



Source(s): Figure created by author

Figure 1.
Scree plot

Factor 5 - Self-satisfaction: The factor loading of this factor ranged from 0.47 to 0.80 which were supported by six indicators. The indicators with highest to lowest factor loading were 12th, 14th, 13th, 11th, 10th and 9th, respectively. The six indicators altogether contributed to self-satisfaction with the eigenvalue = 3.75 and this factor contributed to happiness in learning with the weight of 11%.

Factor 6 - Readiness to learn: The factor loading of this factor ranged from 0.37 to 0.52 which were supported by seven indicators. The indicators with highest to lowest factor loading were 4th, 8th, 7th, 6th, 2nd, 3rd and 5th, respectively. The seven indicators altogether contributed to readiness to learn with the eigenvalue = 2.58 and this factor contributed to happiness in learning with the weight of 7% as shown in Table 2.

Table 2 showed the weight of factors and indicators contributing to happiness in learning ranging from highest to lowest of the six factors and the 34 indicators. They were satisfaction with learning environment with five indicators and eigenvalue = 4.32, learning anxiety with

Indicator	Factor loading 1	2	3	4	5	6	Eigenvalue (%)	% of variance	Cumulative variance (%)
33	0.90						4.32	12	12
32	0.84								
34	0.82								
35	0.81								
31	0.80								
27		0.90					3.52	10	22
26		0.85							
30		0.84							
29		0.78							
28		0.77							
15			0.79				4.17	12	34
18			0.78						
16			0.75						
17			0.70						
19			0.67						
21				0.76			4.40	13	47
23				0.75					
22				0.70					
24				0.69					
25				0.62					
20				0.46					
12					0.80		3.75	11	58
14					0.65				
13					0.64				
11					0.56				
10					0.48				
9					0.47				
4						0.52	2.58	7	65
8						0.51			
7						0.48			
6						0.47			
2						0.46			
3						0.39			
5						0.37			

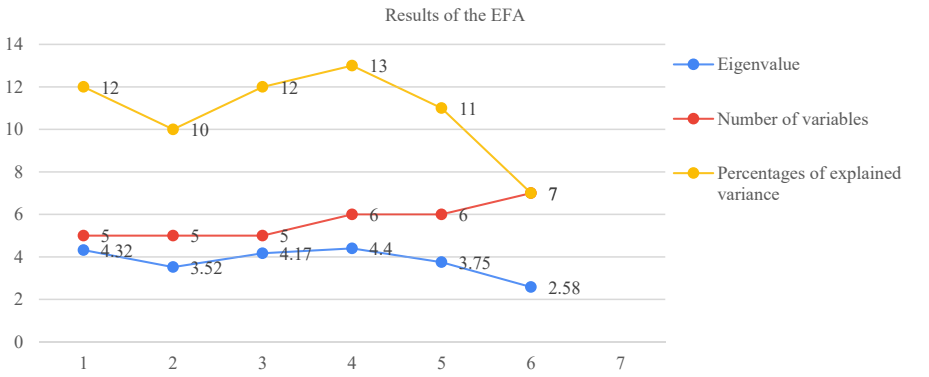
Source(s): Table created by author

Table 2. The weight of factor loading with percentages of eigenvalue, explained variance and cumulative variance of each factor

five indicators and eigenvalue = 3.52, satisfaction with learning with five indicators and eigenvalue = 4.17, enthusiasm to learn with six indicators and eigenvalue = 4.40, self-satisfaction with six indicators and eigenvalue = 3.75, and readiness to learn with seven indicators and eigenvalue = 2.58. The six factors could explain the cumulative variance of the 34 indicators at 65% as shown in Figure 2.

The analysis of correlation between happiness in learning indicators of the six factors was significantly correlated at the 0.01 level except the learning anxiety factor that lowly correlated with other factors. The highest correlation coefficient was between enthusiasm to learn and self-satisfaction followed by satisfaction with learning and enthusiasm to learn and between satisfaction with learning environment and satisfaction with learning with the correlation coefficient = 0.65, 0.61 and 0.59, respectively as shown in Table 3.

Based on the McDonald's assessment technique (McDonald, 1970, 1999) or the Omega or ω technique, it was found the ω value of the reliability of learning happiness factors of undergraduate students of the TOU was = 0.97. Taking into account the ω value of individual factors, it was found that learning anxiety was given the highest ω value which was = 0.93 followed by satisfaction with learning, enthusiasm to learn, self-satisfaction, readiness to learn and satisfaction with learning environment with the ω values = 0.92, 0.92, 0.91, 0.86 and 0.83, respectively. This meant that every factor is reliable which was corresponding with Rodriguez *et al.*'s proposition (2016) who proposed that the ω value of 0.80 or greater was reliable. Details of these were shown in Table 3.



Source(s): Figure created by author

Figure 2.
Eigenvalue, number of indicators and percentages of explained variance of each factor

Factor	1	2	3	4	5	6	ω
1. Satisfaction with learning environment	1						0.83
2. Learning anxiety	0.08	1					0.93
3. Satisfaction with learning	0.59**	−0.01	1				0.92
4. Enthusiasm to learn	0.46**	0.01	0.61**	1			0.92
5. Self-satisfaction	0.31**	0.05	0.52**	0.65**	1		0.91
6. Readiness to learn	0.31**	0.02	0.38*	0.44**	0.49**	1	0.86
Total							0.97

Note(s): $^{**}p < 0.01$
Source(s): Table created by author

Table 3.
The correlation coefficient between the happiness in learning factors

(3) Through the confirmatory factor analysis (CFA), it was found that the construct of the happiness in learning model was valid with χ^2 = 1421.753, df = 519, χ^2/df = 2.739, comparative fit index (CFI) = 0.900, goodness of fit index (GFI) = 0.955, adjusted goodness of fit index (AGFI) = 0.945, root mean square error of approximation (RMSEA) (90% CI) = 0.072 (0.068 – 0.077), standardized root mean square residual (SRMR) = 0.055 as shown in Table 4.

Discussion

The following findings are worth further discussion.

(1) Findings on the development of indicators of happiness in learning of undergraduate students at the TOU.

Through the analysis of indicator components of happiness in learning of undergraduate students at the TOU, it was found that there were six factors contributing to happiness in learning. They were satisfaction with learning environment, learning anxiety, satisfaction with learning, enthusiasm to learn, self-satisfaction and readiness to learn. In fact the happiness in learning of individual students involved a few people. Particularly in the open learning university, the students themselves, the university personnel and university physical facilities were the key factors influencing learning happiness. Students could be satisfied or dissatisfied with their own learning, enthusiasm to learn, become self-satisfied and be ready to learn. The findings were in accordance with Thongsom's findings (2011) which found that happiness in learning of Thai nursing students were learning anxiety, satisfaction with learning, enthusiasm to learn and self-satisfaction. However, readiness to learn was another important factor contributing to learning happiness. Dean and Gibbs (2015) found that the balance between academic and social life had some influence on happiness in learning. Moussa and Ali (2022) found that students' happiness levels were found to be correlated with their academic success. The open university should create a physical learning environment that facilitates conducive learning so that students become satisfied with the environment and learning, and consequently become part of the university, with the feeling of happiness in learning being developed. This was in accordance with the findings of Jaiboontan *et al.* (2018) and Mangeloja and Hirvonen (2007) who found that the factors contributing to happiness in learning of students were the university's physical learning environment, physical learning resources and co-curricular activities.

Learning anxiety was another factor that affected happiness in learning of undergraduate students at the TOU. But it reversely correlated with learning happiness. If the students were anxious less, they became happier in learning. In contrast, if they were more anxious, they became less happy. Argyle (2001) found that the positive attitude of a person towards things indicated that a person had a good attitude towards such a thing. He/she appreciates and

Measure	χ^2	df	χ^2/df	CFI	GFI	AGFI	RMSEA (90% CI)	SRMR
Values	1421.753	519	2.739	0.900	0.955	0.945	0.072 (0.068–0.077)	0.055
Criteria fit model			<5*	≥0.90**	≥0.90**	≥0.80**	≤0.08**	<0.08**

Note(s): CFI = comparative fit index; GFI = goodness of fit index; AGFI = adjusted goodness of fit index; RMSEA = root mean square
Error of approximation; CI = confidence interval; SRMR = standardized root mean square residual
* = Tabachnick and Fidell (2013), ** = Hu and Bentler (1999)
Source(s): Table created by author

Table 4.
Fit indices of the construct of the happiness in learning model

perceives the value of it. He/she enjoys, has fun with, is happy with and always remembers such a good experience. On the other hand, the negative attitude of a person towards things could bring about suffering, such as the feelings of bore, uneasiness and stress. Human beings always look for betterment. They always look for solutions to improve themselves and their society.

Looking at individual factors contributing to happiness in learning, it was found that satisfaction with Learning Environment with five indicators was the most important factor. Among the five indicators, academic services, particularly the remedial learning in various forms of the university, carried the highest factor loading value and was considered the most important indicator. Even though the open university emphasizes self-learning, the university is advised to give high emphasis to this indicator. It can help the students learn better. In addition, texbooks, journals, and digital learning sources are key factors contributing to happiness in learning. This corresponds with Yılmaz and Karataş's (2022) finding which found that students cared about printed materials, and quality and quantity of the learning resources. Taylor and White (1991) found that not all topics included in the distance learning curriculum were suitable for distance teaching. In particular difficult topics and concepts difficult to understand require supplementary academic services. The face-to-face lecture, VCD (video compact disc), the Internet, the online learning and the e-tutorial are therefore recommended. The institute needs to make learning technology easily accessible to its students. Burns (2011) further stated that the blended learning that combines face-to-face and online learning by beginning with some lectures, followed by course exercises and some multimedia presentations could strengthen opportunities for success of distance learning. Therefore, the strengthening of greater opportunities for success through the provision of academic services, as mentioned above, could facilitate learning happiness of the students.

Learning anxiety was the second factor with five indicators effecting happiness in learning. The indicator that carried the highest factor loading value was the feeling of learning anxiety due to the lack of skills and experience in learning within the distance learning system of the open university. It was the indictor that the open university should pay attention to. The university may organize activities leading to the reduction of student learning anxiety since learning anxiety could lead to boredom, less attention to learning lessons, low achievement and dropout. This was in accordance with the finding of Fojtík's (2018) who found that the achievement rate of distance learning students was low (only 39%) as compared with full-time conventional students at the rate of 64% and the finding of Bundasak *et al.* (2017) who stated that stress could bring about unhappiness in learning and consequently lead to poor performance, low achievement and finally dropout. DePoy and Gilson (2008) found that the wish to succeed and achieve growth in life could maximize learning potential of individual; therefore, to achieve learning happiness a person needed to leave anxiety in learning behind. He/she could not be afraid of error or failure while investing effort in learning.

Satisfaction with learning was the third important factor with five indicators. The indicator with highest factor loading was satisfaction with activities between lecturers and students and among students themselves. This indicator made students feel happy and satisfied. Franklin *et al.* (1996) found that the use of communication technology in student-lecturer activities and student-student activities such as LINE application, Facebook, YouTube, audio or video chat, video conference could reduce the feeling of loneliness among students and create greater opportunity for social interactions among themselves and also with others. This corresponds with Yılmaz and Karataş's (2022) finding which found that social integration which included student–student interactions, student–instructor interactions and being present in the campus environment were the important factors that affected student retention. Graham *et al.* (2001) found that the most efficient technique in teaching was the one that promoted interactions between teachers and students. The teacher

should demonstrate effective interactions between the teacher him/herself and his/her students and among students themselves as well as the expectation the teacher expects from the interactions. The teacher should specify what he/she expects from questions given out to the class. Very often, student answers might not match with the answers designed but the teacher could help them to do better. Therefore in the higher education open learning system, the lecturer should create happiness in learning and make learning joyful through continued learning activities between lecturers and students and among students themselves. The happiness in learning behavior could be observed through industriousness in participating in learning activities, enthusiasm to learn, and love of the lecturers as well as of their colleagues.

Enthusiasm to learn was the fourth important factor with six indicators. The indicator with highest factor loading value was the Enthusiasm to Search for New Knowledge. This indicated that the Enthusiasm to Learn was the most important indicator that made students happy in learning. Once they were happy, they could learn better. Choomeka and Prachanban (2018) also found that students who knew how to up skill themselves would learn happily.

Self-satisfaction was the fifth important factor with six indicators. The indicator with highest factor loading value was the love and proud of oneself. The indicator love and proud of oneself made a person feel stable emotionally and spiritually. This indicator would make a person love and value himself. A person who sees his own potential and maximize the utilization of his potential for his own benefit could be proud of himself. Once a person loves and values himself, he could develop his own ability, personality, healthiness, etc.; and consequently makes himself happy. He could live his life efficiently. This was in accordance with Dean and Gibbs's finding (2015) which found that a person who believed that he could do it influenced happiness in learning of higher education students.

Readiness to learn was the least important factor with seven indicators. The factor with highest factor loading value was the endurance with the use of comprehension skills in comprehending what one reads. This indicated that students of higher education open university who could comprehend what they read could facilitate their happiness in learning since open university students needed to learn on their own. They needed to learn through multimedia, such as textbooks, printed materials, electronic learning sources, computer-assisted instruction, and audio and video cassettes. This was in accordance with the finding of Keawchuer (2014) which found that knowledge, skills and attitude had great impact on learning; and UNESCO (united nations educational, scientific and cultural organzation) publication (2009, as cited in de-la-Peña and Luque-Rojas, 2021) which claimed that high reading comprehension skills facilitated learning. The students with high reading comprehension skills enjoy reading and consequently improve their learning readiness.

Through the review of factor loading values of all indicators, the researcher found that the health indicator did not impede learning. This indicator was later removed from the list. The factor loading value of this indicator was less than 0.30. This could explain that health was not the impediment of learning; and might not be directly involved with student learning happiness. The finding contradicted with findings of Rahimi Khalifeh Kandi *et al.* (2021) and Jiang *et al.* (2022) who found that happiness was one of the important causes of mental health that effected human healthcare.

(2) Through the analysis of the correlation among the six happiness learning factors, it was found that the six factors were significantly correlated, except the learning anxiety factor that had low correlation with the remaining factors. This meant that the learning anxiety was independent from others.

(3) Through the confirmatory factor analysis of the proposed "happiness in learning" model, it was found that the model corresponded with empirical data and Thorndike's (1932) law of readiness and law of exercise or connections. Once a person is ready to learn, he can learn better. If a person is physically, intellectually, socially, emotionally

and spiritually fit, he can strengthen his or her learning. Also, a person's learning is strengthened if stimulus (S) and response (R) or S-R are connected. The finding also corresponded with Walberg's (1981) educational productive theory which states that the following factors effect a person's learning – (1) personal attributes, (2) school's physical learning environments, (3) family and community learning environments and (4) peer learning environment. Specifically, once a person is ready to learn, satisfied with learning environments, and motivated and enthusiastic to learn, he can learn happily.

Conclusion

The indicators of happiness in learning of undergraduate students of the Thai open university comprised 34 indicators of six factors. They are satisfaction with learning environment (five indicators), learning anxiety (five indicators), satisfaction with learning (five indicators), enthusiasm to learn (six indicators), self-satisfaction (five indicators) and readiness to learn (seven indicators).

However, the questionnaire respondents of this research were dominated by the Gen Z (age lower than 25), the Millennial (age between 26 and 41), and the Gen X (age between 42 and 57) respondents where in fact a big portion of the university enrollment aged over 57 but very few of this age-group responded to the questionnaire. The respondents were widely dispersed and could not represent any age group. The findings were only the aggregate indicators' value of all age groups. Therefore, happiness learning indicators of individual age groups of students are worth further investigation.

Recommendations

With the above findings and discussions, the researcher recommends that the TOU, specifically the academic program coordinators, the university administrators and the lecturers study the developed indictors and use them as information for educational planning as well as for the learning design of the courses for higher happiness in learning of their students. The open-university should promote student development activities in addition to conventional teaching and learning activities. This will allow students to develop themselves and make them learn more efficiently and happily. For instance, the university may provide academic services in the form of guidance and counseling, and learning aid. The users of these indicators should study thoroughly their target clientele. The indicators developed were for the undergraduate students of the TOU, therefore, the indicators are suitable with similar groups of clientele. The use of these indicators with other groups should be selective. It is advised that the indicators be modified before using with other groups.

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