OPEN ACCESS

Manuscript ID:
EDU-2025-13039188

Volume: 13

Issue: 3

Month: June

Year: 2025

P-ISSN: 2320-2653

E-ISSN: 2582-1334

Received: 25.04.2025

Accepted: 26.05.2025

Published Online: 01.06.2025

Citation:
Ketwit, K., & Bhuranahirunn, S. (2025). A Development Indicators of Students' Learning Happiness Science Subjects in High School Belongs to Nakhon Sawan Secondary Education Area Office. *Shanlax International Journal of Education*, *13*(3), 82-90.

DOI:
https://doi.org/10.34293/education.v13i3.9188

A Development Indicators of Students' Learning Happiness Science Subjects in High School Belongs to Nakhon Sawan Secondary Education Area Office

Kitinapha Ketwit
Nakhon Sawan Rajabhat University, Thailand

Siribhorn Bhuranahirunn
Nakhon Sawan Rajabhat University, Thailand
https://orcid.org/0009-0000-9221-5970

Abstract
The objective of this research is to develop indicators of happiness in science learning among upper secondary school students and to analyze the components of indicators of happiness in science learning among upper secondary school students. The sample group consisted of 960 upper secondary school students enrolled in the second semester of the 2022 academic year under the Nakhon Sawan Secondary Educational Service Area Office, selected using multistage random sampling. The research instrument was a questionnaire consisting of 48 items using a five-point Likert scale. Content validity was examined by five experts, and the reliability was analyzed using Cronbach's alpha coefficient and data were analyzed using exploratory factor analysis (EFA) with the SPSS. The research findings revealed that there were 48 indicators of happiness in science learning among upper secondary school students. The content validity ranged from 0.60 to 1.00, and the reliability coefficient was 0.98. The results of the exploratory factor analysis of the indicators of happiness in science learning among upper secondary school students revealed four components: (1) positive attitudes toward science learning, consisting of 13 indicators; (2) discipline in science learning, consisting of 15 indicators; (3) self-management for the development of science learning, consisting of 11 indicators; and (4) positive relationships in science learning, consisting of 9 indicators. Together, these four components accounted for 94.089% of the total variance.

Keywords: Indicator Development, Happiness in Learning Science, Factor Analysis, Secondary Education, Thailand, Student Well

Introduction

Science plays a significant role in the global learning society, where knowledge acquisition is continuous and ever-evolving. It is a key discipline that enables individuals to understand and keep pace with rapid global changes, while also fostering a balanced and sustainable approach to managing and conserving natural resources. Scientific literacy further contributes to enhancing critical thinking, driving economic development, and ultimately improving the quality of life, enabling people to live together harmoniously and with well-being.

In line with these global trends, Thailand's national education policies have increasingly recognized the importance of learners' emotional well-being and happiness as fundamental components of educational success. The National Education Plan (2017–2036) highlights the need for holistic development cognitive, emotional, and social emphasizing that learning should be a joyful and meaningful experience. This vision is further reflected in the Ministry of Education's policies, which advocate for student-centered learning

environments and promote the concept of "Happy Schools" that cultivate motivation, engagement, and overall well-being. Moreover, Thailand's adoption of UNESCO's Happy Schools Framework reinforces the commitment to nurturing learning spaces that are safe, inclusive, and enjoyable for all students (UNESCO, 2016). Within this context, science education plays a critical role—not only in developing scientific thinking and inquiry skills but also in fostering positive emotional experiences that lead to long-term engagement and satisfaction in learning.

For learners, science education emphasizes experiential learning through engagement with real-world phenomena, objects, living organisms, and events in the surrounding environment. These experiences offer learners the opportunity to discover answers on their own. The learning process encourages the integration of knowledge and experiences with scientific thinking processes, including experimentation, modeling, critical, and creative thinking. Furthermore, scientific understanding supports the development and application of technology, which is essential to progress in various fields such as industry and healthcare.

Effective science instruction should move beyond traditional lecture-based approaches. Educators are encouraged to adopt strategies that actively involve students in hands-on learning, using scientific methods as tools for inquiry and knowledge construction. This includes the development of scientific process skills, experimental abilities, and analytical thinking. Students take on active roles as problem-solvers and knowledge constructors, learning through collaboration and multimedia integration. The use of videos, websites, and platforms such as YouTube enhances engagement, curiosity, and motivation to learn.

Happiness in learning arises when students engage with authentic experiences and the natural world. It includes opportunities for self-discovery, collaboration, and enjoyment in classroom activities under cooperative norms. Authentic learning and authentic assessment help students apply their knowledge to real-life contexts. A happy learner is characterized by positive emotions, satisfaction, curiosity, and a strong drive to learn. Key components include interest in learning, positive attitude toward the subject, intrinsic motivation, and satisfaction with learning experiences.

Conversely, a lack of happiness in science learning can lead to anxiety, negative emotional responses, and fear of failure. Students may perceive science as difficult, overly dependent on memorization, and intimidating. This perception can reduce confidence, discourage experimentation, and increase stress. Consequently, students may disengage from active learning, limit peer interaction, and experience pressure from competition, rather than a genuine desire to understand the subject.

Previous research has primarily emphasized academic achievement rather than students' happiness or positive emotional experiences in science learning. Moreover, many studies have focused on teaching methods or science content while overlooking the development of measurement tools or the identification of factors that contribute to happiness in science learning among upper secondary school students. This study aims to fill that gap by systematically exploring indicators of happiness in science learning. The findings will serve as a foundation for designing instructional approaches that foster motivation and sustainable enjoyment in science education.

In response to these challenges, this study aims to investigate the components of indicators of happiness in science learning among upper secondary school students. The goal is to develop effective instructional strategies and reliable assessment tools that promote meaningful, enjoyable, and student-centered science learning experiences. By moving away from passive, lecture-based approaches and encouraging students to engage in hands-on activities, this research seeks to foster analytical thinking, curiosity, engagement, and scientific process skills. Ultimately, learners will be able to integrate knowledge, solve problems, share insights, and apply what they learn to real-life contexts.

Review of Literature

The creation of indicators of the learning happiness of students concerning science subjects in high schools implies the comprehension of multiple

aspects of learning satisfaction and involvement. Studies have identified some of these basic elements that affect the happiness and well-being of students. Among the remarkable factors is the satisfaction of the basic psychological needs which has been observed to bear positive relationship with happiness in the school environment. As an example, addressing these needs is associated with positive experiences and emotional growth in physical education classes among the adolescent population, but it is not related to obesity rates (Yun et al., 2023).

The other area of concern is the importance of interpersonal relations and the way positive relations with peers and family could contribute to the happiness and academic performance of students to a great extent. The experimental research performed among primary students has demonstrated that relationships with parents and peers are major predictors of subjective happiness and may mediate the outcomes of academic success (Leung et al., 2021).

In addition, students may be influenced by the quality and the perceived nature of education and its curiosity. Heavy curiosity leads to better academic achievement, especially in tough learning situations where students see themselves as fostering their development and learning principles (Kashdan & Yuen, 2007).

There has also been some focus on how positive psychology can be implemented in schools with the aim of enhancing positive feelings, resilience and character strengths in order to encourage happiness and academic achievement. Positive psychology interventions in schools have proven to have a great impact on the well-being and educational outcomes of students (Alam, 2022).

Social elements like using the social networking sites are also contributory. The degree of psychological well-being and happiness of students can be determined by the level of their use of such media as Facebook and Twitter. The high engagement of social media has been linked to an increased degree of happiness and life satisfaction and even generally more positive psychological well-being in high school students (Doğan, 2016).

Research Objectives

To develop indicators of happiness in science learning among upper secondary school students and to analyze the components of indicators of happiness in science learning among upper secondary school students.

Conceptual Framework of the Research

The conceptual framework of this research is based on various theories and concepts related to the components involved in developing indicators of happiness in learning science. These include: the concept of happiness in learning, components of happy learning, Maslow's hierarchy of needs, theories of personality development, positive education, happy learning theory, Thorndike's connectionism theory, Bandura's social-cognitive theory, Gagné's eclectic learning theory, behaviorist learning theory, cognitive learning theory, and social learning theory. These theories and concepts are related to indicators of happiness in science learning, which consist of Curiosity and Interest in Learning, Attitudes, Motivation to Learn, Self-Esteem, Self-Regulation / Time Management.

Research Methodology

The research on studying the effects of developing research competencies for learning development of student teachers at Nakhon Sawan Rajabhat University was designed by the researcher according to the following research methodology:

Population and Sample Group

The population consisted of 15,742 upper secondary students in the second semester of the 2022 academic year from five school clusters under the jurisdiction of the Secondary Educational Service Area Office Nakhon Sawan.

The sample group included 960 upper secondary students from the same academic period and educational jurisdiction. The sample size was determined based on 20 times the number of variables studied, using a multi-stage random sampling method.

Variables

The variable studied was the components of

indicators of learning happiness in science subjects among upper secondary school students

Research Instruments

The research instrument used in this study was a questionnaire measuring learning happiness in science subjects among upper secondary school students. The questionnaire was divided into two parts as follows:

- Part 1: A basic information questionnaire in the form of a checklist, which included gender, grade level, and school.
- Part 2: A learning happiness questionnaire in science subjects developed by the researcher. This section consisted of 48 items using a five-point Likert rating scale: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. The scoring criteria were based on the degree of agreement.

Data Collection Procedure

- School students were distributed online via Google Forms, along with an attached document providing instructions and explanations regarding the process for completing the questionnaire.
- Cooperation was coordinated with responsible teachers at each school to clarify the procedures for administering the questionnaire to students.
- The administration of the questionnaire was monitored by checking the number of student respondents recorded in the Google Form system.
- The number and completeness of the returned questionnaires were verified. A total of 960 completed questionnaires were returned, representing a 100% response rate

Data Analysis

Exploratory factor analysis (EFA) was conducted by first testing the suitability of the data using Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. Principal Component Analysis (PCA) was employed for factor extraction, and the factors were rotated using an orthogonal rotation method—specifically, the Varimax method. The analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 27.

Results

The research findings are as follows:

- The development of indicators of happiness in science learning among upper secondary school students resulted in 48 indicators, with content validity values ranging from 0.60 to 1.00 and a reliability coefficient of 0.98.
- The component analysis of these indicators revealed four main components of happiness in science learning for upper secondary school students; Component 1: Positive Attitude Toward Learning Science – includes 13 indicators. Component 2: Discipline in Science Learning – includes 15 indicators. Component 3: Self-Management for Science Learning Development – includes 11 indicators. Component 4: Positive Relationships in Science Learning – includes 9 indicators. These four components together explain 94.089% of the variance.

Table 1 Results of Correlation Matrix Significance Test

Statistical Values		Analysis Results
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.979
Bartlett's Test of Sphericity	Approx. Chi-Square	35395.076
	df	1128
	Sig.	0.000
	n	960

From Table 1, the Kaiser-Meyer-Olkin (KMO) measure was found to be 0.97, which is greater than the threshold value of 0.40, indicating that the sample size is adequate. Additionally, Bartlett's Test of Sphericity was statistically significant at the 0.00 level, which is less than 0.05. Therefore, it can be concluded that the data collected from the sample are suitable for use in the factor analysis of the indicators of happiness in learning science among senior high school students.

Table 2 The Number of Components, Eigenvalues, Percentage of Variance Explained

Component	Eigenvalue	% of Variance
1	23.433	48.819
2	2.762	5.753
3	1.799	3.747
4	1.207	2.514

5	1.074	2.237
6	1.023	2.131

According to Table 2, based on the eigenvalues of 48 variables, a total of six components were extracted. These six components collectively accounted for 65.201% of the total variance in the indicators of happiness in learning science among upper secondary school students.

From the results of the factor analysis, it was observed that Components 4 to 6 had similar eigenvalues 1.207, 1.074, and 1.023, respectively. The indicators grouped under these components exhibited closely related behavioral patterns, making it difficult to distinctly differentiate them. Therefore, the researcher decided to combine Components 4 to 6 into a single component, resulting in 15 indicators. A new factor analysis was subsequently conducted, and the results are presented as follows:

Table 3 The Number of Components, Eigenvalues, Percentage of Variance Explained (Second Analysis)

Component	Eigenvalue	% of Variance
1	23.433	48.819
2	5.365	35.77
3	2.762	5.753
4	1.799	3.747

From Table 3, the eigenvalue analysis of the 48 variables revealed a total of 4 components. When combining Components 4 to 6 into a single component containing 15 indicators, the new component showed an eigenvalue of 5.365, accounting for 35.77% of the variance. This adjustment resulted in an increase in the cumulative percentage of explained variance from the original 65.201% (from 6 components) to 94.089%.

Table 4 Component 1 of Indicators of Happiness in Learning Science among Upper Secondary School Students

Variable	Indicators	Factor loading
1	pays attention to and is interested in learning science.	0.618
2	makes an effort to ask questions and exchange ideas with the teacher.	0.660
3	tries to find answers to the questions.	0.602
4	does not feel bored during science lessons.	0.740
7	puts effort into researching answers to difficult and challenging questions.	0.623
9	consistently seeks up-to-date knowledge about science.	0.602
10	understands the benefits of learning science.	0.463
11	applies the knowledge gained from science lessons to everyday life.	0.560
24	does not feel exhausted or discouraged when taking tests or facing difficult questions.	0.611
25	has good role models in learning science.	0.536
27	able to learn science anytime and anywhere.	0.504
29	able to encourage and guide peers to develop a positive attitude toward science.	0.491
40	enjoys learning science.	0.579
Eigen Value - 23.433; % of Variance - 48.819		

From Table 4, it was found that Component 1 of the indicators of happiness in learning science among upper secondary school students consists of 13 indicators. The factor loadings range from 0.463 to 0.740, and the eigenvalue is 23.433. This component was named “Positive Attitude Toward Science Learning.”

Table 5 Component 2 of Indicators of Happiness in Learning Science among Upper Secondary School Students

Variable	Indicators	Factor loading
5	Attend class on time	0.688

6	Is prepared for learning and brings necessary materials	0.666
8	Dedicates oneself to learning, tasks, and assigned activities	0.513
12	Feels happy when giving correct answers	0.531
26	Behaves according to good role models whom one respects	0.489
28	Is well aware of reliable information sources	0.424
30	Feels proud when praised by the teacher after completing tasks successfully	0.694
31	Feels proud when receiving school-wide praise, e.g., awards at flag ceremony	0.712
32	Interested in participating in academic competitions to test personal knowledge	0.482
33	Feels proud when receiving praise from family members	0.627
35	Declines tasks beyond own ability with reasonable and constructive justification	0.514
37	Does not compare own abilities with those of peers	0.558
38	Uses personal learning experience to give advice to juniors and peers	0.657
Eigen Value - 5.365; % of Variance - 35.77		

From Table 5, Component 2 consists of 15 indicators with factor loadings ranging from 0.424 to 0.712, and an eigenvalue of 5.365. This component was named "Discipline in Science Learning."

Table 6 Component 3 of Indicators of Happiness in Learning Science among Upper Secondary School Students

Variable	Indicators	Factor loading
34	Is proud of their academic performance and has the desire to improve further	0.480
36	Accepts own abilities and understands disappointment	0.617
39	Has a plan to improve their learning	0.532
41	Expresses good mood and smiles with friends	0.612
42	Expresses good mood and smiles with teachers	0.607
43	Can self-motivate to avoid boredom or discouragement in learning science	0.462
44	When mistakes occur during activities, can manage emotions positively	0.545
45	Can control emotions well when opinions differ from others	0.699
46	Willing to correct mistakes made during work	0.755
47	Willingly accepts differing opinions from peers	0.758
48	Willingly accepts differing opinions from teachers	0.755
Eigen Value - 2.762; % of Variance - 5.753		

From Table 6, Component 3 consists of 11 indicators with factor loadings ranging from 0.462 to 0.758, and an eigenvalue of 2.762. This component was named "Self-Management for Science Learning Development."

Table 7 Component 4 of Indicators of Happiness in Learning Science among Upper Secondary School Students

Variable	Indicators	Factor loading
13	Is generous with classmates	0.582
14	Clearly assigns responsibilities during group activities	0.546
15	Volunteers for tasks and activities without being assigned	0.589
16	Feels friendly, safe, and warm when with the science teacher	0.589
17	Able to ask the teacher questions in a constructive manner	0.593

18	Pays attention to the teacher's instruction and applies it	0.586
19	Willingly accepts suggestions from teachers and peers	0.566
20	Shares scientific knowledge beyond the lessons with friends and teachers	0.560
21	Takes interest in science news from various media to continually improve oneself	0.545
Eigen Value 1.799; % of Variance - 3.747		

From Table 7, Component 4 consists of 9 indicators with factor loadings ranging from 0.545 to 0.593, and an eigenvalue of 1.799. This component was named "Positive Relationships in Science Learning."

Discussions

Component 1 – Positive Attitude toward Learning Science

Attentiveness, curiosity, and class engagement are linked to the idea of students being very happy with science learning. They are eager to pose questions, discuss difficult tasks and use science knowledge in their everyday life. Favorable role models and chances to motivate others further enhance them in terms of motivation and determination, which results in general pleasure and interest in learning science.

Component 2 – Discipline in Science Learning

The elements of discipline and responsibility are the key factors that contribute to the achievement of happiness in science learning. On-time, readiness, and task performance enable the students to obtain confidence and fulfillment. Teacher and family recognition, academic competitions, also increase self-esteem. Such behaviors also promote resilience, decrease stress, and both academic success and affective well-being.

Component 3 – Self-Management in Science Learning

Self-management helps students to be proud of their performance, tolerate their strengths and weaknesses and remain positive even when they fail. They can motivate themselves, manage their feelings, and learn out of errors, which boosts their persistence and academic achievement. Cognitive flexibility and emotional composure in group work also yield satisfaction and self development in science learning.

Component 4 – Positive Relationships in Science Learning

Positive interactions with peers and teachers provide a feeling of protection, collaboration, and interaction. Students enjoy getting constructive feedbacks, having meaningful discussions and sharing of knowledge outside the classroom. Good relationships promote teamwork, endurance, and motivation and thus learning science is not only enjoyable but also rewarding.

Recommendations

Recommendations for Utilization the Research Results

The results of developing indicators of happiness in science learning among upper secondary school students consist of four components: Positive Attitude Toward Learning Science, Discipline in Science Learning, Self-Management for Science Learning Development, Positive Relationships in Science Learning. These findings can be applied by school administrators and teachers in planning learning management, analyzing learners, and adjusting the interaction between teachers and students to foster a positive attitude toward science. This will help create happiness in learning and support students in achieving educational goals, cultivating discipline and self-management in learning science.

The research found that positive attitude toward learning science was the most significant indicator of happiness in science learning. This component acts as a starting point; when students have a positive attitude toward learning, they are more willing to engage with the subject, come prepared, and feel happy when studying it. Teachers should focus on cultivating positive attitudes by encouraging questioning, discussions, and inquiry into challenging and thought-provoking topics. This helps students build confidence and pride in their academic abilities.

The research also found that the component with the lowest value was positive relationships in science learning. Therefore, teachers should act as facilitators to strengthen student relationships by designing

learning activities that encourage collaboration, teamwork, and mutual support from the beginning to the end of the learning period. Activities should include textbook study, hands-on experiments, and open-ended questions for group exploration. Students should feel comfortable asking questions, receiving constructive feedback from teachers and peers, and engaging in a supportive learning environment.

Recommendations for Future Research

Future studies should explore indicators of happiness in science learning across other student grade levels.

- This research focused on developing indicators based on learner-related variables. Therefore, future studies should also examine variables from other stakeholders such as teachers, parents, and administrators, who may provide additional perspectives on key indicators.
- This study is a survey research using factor analysis to develop indicators of happiness in science learning at the upper secondary school level. Further research is needed to validate these findings.

Research Limitations

While the study provides valuable insights into the development of indicators of students' happiness in science learning, certain limitations should be acknowledged:

Limited Generalizability: The study was conducted solely among upper secondary school students under the jurisdiction of the Nakhon Sawan Secondary Education Service Area Office. Therefore, the findings may not be generalizable to students from other regions or educational levels.

Self-Reported Data: The data were collected using self-reported questionnaires, which may be subject to response bias. Students may have over- or under-reported their feelings and behaviors due to social desirability or personal perception.

Cross-Sectional Design: The research employed a cross-sectional survey design, which captures data at one point in time. As a result, it cannot capture changes in students' happiness over time or determine causal relationships between variables.

Focus on Student Perspective Only: The study focused exclusively on student-related indicators. It did not include perspectives from other stakeholders such as teachers, parents, or school administrators, who may have additional insights into factors affecting students' happiness in learning science.

Lack of Qualitative Data: The use of a purely quantitative method may have limited the depth of understanding regarding the context or reasons behind students' experiences of happiness. Incorporating interviews or focus groups in future studies could provide richer data.

References

Alam, A. (2022). Positive psychology goes to school: Conceptualizing students' happiness in 21st century schools while 'Minding the Mind!' Are we there yet? Evidence-backed, School-based positive psychology Interventions. *ECS Transactions*, *107*(1).

Aubineau, M., & Blicharska, T. (2020). High-functioning autistic students speak about their experience of inclusion in mainstream secondary schools. *School Mental Health*, *12*(3), 537-555.

Doğan, U. (2016). Effects of social network use on happiness, psychological well-being, and life satisfaction of high school students: Case of Facebook and Twitter. *Education and Science*, *41*(183), 217-231.

Jaijing, J., Toadithep, T., Anannawee, P., & Sompongtam, C. (2020). Factors affecting among happiness in learning of the freshman students in the Faculty of Humanities and Social Sciences, Burapha University. *Academic Journal of Humanities and Social Sciences Burapha University*, 28(1), 29-47.

Kashdan, T. B., & Yuen, M. (2007). Whether highly curious students thrive academically depends on perceptions about the school learning environment: A study of Hong Kong adolescents. *Motivation and Emotion*, *31*(4), 260-270.

Leung, C., Leung, J. T. Y., Kwok, S. Y. C. L., Hui, A., Lo, H., Tam, H. L., & Lai, S. (2021). Predictors to happiness in primary students: Positive relationships or academic

achievement. *Applied Research in Quality of Life*, *16*(6).

Meissner, T. M., Kloppe, C., & Hanefeld, C. (2012). Basic life support skills of high school students before and after cardiopulmonary resuscitation training: A longitudinal investigation. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, *20*(1).

Sudsaad, S., Lila, S., & Sutthitatip, S. (2017). A development of happiness scale as perceived by students in schools under primary educational service area office in eastern of Thailand. *Journal of Education Naresuan University*, *19*(3), 103-117.

Supannopaph, P., & Sukjairungwattana, T. (2024). Guidelines for developing happiness in learning among teaching profession students in the Western Region. *Journal of Educational Measurement Mahasarakham University*, *30*(2), 239-255.

UNESCO. (2016). *Happy Schools: A Framework for Learner Well-being in the Asia-Pacific*.

Ursula, P. A. (2024). Application of humanistic learning theory in increasing student learning motivation. *International Journal of Sustainable Social Science*, *2*(5), 323-334.

Waters, L., & Higgins, M. C. (2022). The impact of a teacher-based positive education intervention on student wellbeing literacy. *Journal of School and Educational Psychology*, *2*(1), 22-43.

Yun, J. S., Lee, G. I., & Kim, B. R. (2023). Association of basic psychological need fulfillment and school happiness with obesity levels and intensity of physical activity during physical education classes in South Korean adolescents. *Healthcare*, *12*(1).

Author Details

Kitinapha Ketwit, *Nakhon Sawan Rajabhat University, Thailand,* ***Email ID****: Kittinapha3896@gmail.com*

Siribhorn Bhuranahirunn, *Nakhon Sawan Rajabhat University, Thailand,* ***Email ID****: siribhorn.b@nsru.ac.th*