



## Development of board game “Live Your Life” for enhancing quality of life of undergraduate students

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### Abstract

This research developed a board game to enhance the quality of life (QOL) for undergraduate students. Version 1 of the game was created based on the needs of undergraduate students and the World Health Organization’s QOL domains. Phase 1 involved a pilot study to evaluate the QOL and satisfaction/opinion of 33 students playing version 1; consequently, version 2 was developed. The congruence of five experts using item objective congruence (IOC) was calculated to indicate the approval of the developed game. Phase 2 evaluated the QOL and satisfaction/opinion of 65 students playing version 2. The average QOL scores were higher after playing version 1. Students enjoyed playing the game and were satisfied with the social aspect of personal relationships. Nearly two-thirds of the students (60.61%) considered playing the game was beneficial for the planning of life skills. However, some students (21.21%) wanted an easier game. In response to student feedback, version 2 was developed. After developing version 2, the QOL of the students was evaluated for case-control groups. Students playing version 1 and studying a QOL document had the highest QOL scores. Students playing both versions had QOL scores higher than students who studied the QOL document. The students with the lowest QOL scores had only studied the QOL document. Most students were satisfied with the improved graphics of version 2 and considered that the game helped create balance in their lives and improved their QOL scores. However, the game used simulated strategies that would differ from those in real life.

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## Introduction

The World Health Organization defined quality of life (WHOQOL) as “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (World Health Organization [WHO], 2012). The domain of QOL consists of physical, psychological, level of independence, social, environmental, and spirituality/religion/personal components (Thompson et al., 2016). QOL at the higher education level has been reported as low among college students, especially in the psychological health domain (Li & Zhong, 2022). This domain can lead to lower happiness including depression, anxiety, and becoming more easily stressed (Ramón-Arbués et al., 2020). This finding was consistent with another study among college students that reported the lowest QOL scores in the psychological health domain but the highest QOL scores in the physical health domain (Ramón-Arbués et al., 2022). In a Thai university study, the overall QOL of students was moderate; however, the lowest QOL scores in first year students were average for mental health, environment, and social relationships (Smithnaraseth & Chansakul, 2018). Thus, the psychological, environmental, and social relationships should be realized to develop QOL.

However, the study of interventions to improve undergraduate students’ QOL was still limited. The literature on undergraduate students’ quality of life (QOL) primarily focuses on factors such as depression, anxiety, and stress (Freitas et al., 2023) and diet quality (Parsons et al., 2025), or highlights the correlation between QOL and other variables such as depression (Fernandes et al., 2023). Despite the existence of various interventions aimed at enhancing QOL, the majority might not align with the satisfaction of undergraduate students. For instance, mindfulness-based stress reduction (Pan et al., 2024) might enhance the psychological aspect, but it might not align with the unique characteristics of undergraduate students preferring entertainment in education. Trybus (2015) considered a game was suitable as a teaching method to improve QOL scores for students, with advantages of safety, high participation, enthusiasm to learn, and immediate feedback being provided to students, as well as it being easier to connect lessons or games to true life contexts. Undergraduate students of the Faculty of Education of one of the universities in Bangkok, Thailand, were chosen in the current

research as subjects aiming to pursue teaching careers after graduation. They require good QOL for their own well-being and that of their future students. Based on previous research on the study of first- to fifth-year undergraduates in the Faculty of Education at one of the universities in Bangkok, Thailand, a board game was developed to enhance the QOL of students. (Jitanan et al., 2023). The student feedback indicated the need for increased mental QOL, independence, and social relationships as a result of playing the game. Their favorite board game characteristics included colorful, attracting attention, focusing strategy, and developing skills.

The current study had the following objectives: (1) to develop a board game using the name “Live Your Life” to enhance QOL for undergraduate students in the Faculty of Education; (2) to compare the QOL of the students before and after playing the board game; (3) to compare the QOL of the students between playing groups and control groups; and (4) to study undergraduate student satisfaction after playing the game.

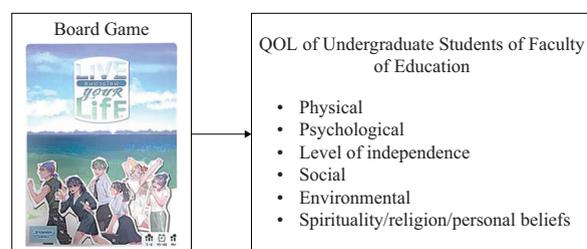
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## Literature Review

Low QOL of university students causes higher stress levels. Many educational, psychological, and social programs are required to increase QOL (Madhesh, 2023). Life balance was significantly related to traumatic stress, with a reasonable life balance providing more happiness and greater stress reduction for general health and well-being (Farber et al., 2020). Furthermore, QOL development is needed to promote an active lifestyle and to improve the negative sedentary behavior of university students because those with the highest positive relation with QOL engaged in physical activity (Nowak et al., 2019). Thus, education, and psychological, social, life balance, and activity should be engaged to develop QOL.

A competitive educational board game was used by students to acquire knowledge based on game rules (Whittam & Chow, 2017). A successful educational board game should provide players with enjoyment and challenge them to memorize and learn (Coil et al., 2017). An educational board game combined increasing the medical knowledge of university nursing students with enjoyable learning. Students should want to play the game and enjoy the competitive aspect (Chang et al., 2022). A study of a diabetes board game named “Candy Gland” presented knowledge regarding analysis, pharmacology, and improved student involvement through playing

this board game due to the easy flashcard gameplay (Twist & Ragsdale, 2022). A board game study on learning anatomy (“Anatomy Adventure”) resulted in the posttest scores being higher than the pretest scores. The game feedback highlighted informatizing, improving attitude, being interesting, and receiving anatomy knowledge (Anyanwu, 2014). In conclusion, the current researchers considered that an educational board game could be an effective method to improve and retain knowledge and improve general attitude and satisfaction. The conceptual framework of this study is shown in Figure 1.



**Figure 1** Research conceptual framework

## Methodology

This study employed the experimental research to answering the research questions. The research procedure was divided into two phases as follows:

### *Phase 1: The Pilot Study of the Board Game “Live Your Life” to enhance Undergraduate Students’ Quality of Life*

A one-group, pretest-posttest design was used for the pilot study and to evaluate QOL following the WHO QOL domains and student satisfaction/opinion after playing the board game in version 1.

#### *Participants*

The study used purposive sampling to select students from the Faculty of Education of one of the universities in Bangkok, Thailand, in nine fields (English Language Teaching, Teaching Thai, Teaching Mathematics, General Science, Commerce Education, Digital Technology for Education, Economics Education, Physical Education, and Health Education) during May 2023. The inclusion criteria included first-fourth-year students who were at least 18 years old, had no severe health conditions that could obstruct their participation in the activity, and gave their consent to participate in this research. The exclusion criteria were that the participants were unwilling to provide information or could not join the entire research

process. At the end, the selected 33 students were the participants in this study.

#### *Measurement*

The tools used in phase 1 included the first version of the board game, which was developed from previous research, the approval of the research ethics by the institutional review board of the researchers' affiliation (COA 65/056), a QOL questionnaire, a satisfaction questionnaire, and a group discussion recording form. Five experts in measurement and evaluation, health education, recreation, and information technology approved the content validity of all questionnaires and group discussion recording forms. We calculated the item objective congruence (IOC), and the results confirmed the content validity of the tools (IOC = 0.80–1.00). The internal consistency of a QOL questionnaire using Cronbach’s alpha method was 0.88.

#### *Data analysis*

A dependent sample *t*-test was used to identify the difference in significance between QOL before and after students playing boardgame version 1. According to the central limit theorem, the number of participants was at least 30 in this study, which was appropriate with the assumption of using a *t*-test to analyse the data (Kwak & Kim, 2017). We used the descriptive statistic to analyse students’ satisfaction, defining the criteria as 1.00–1.49 not satisfied, 1.50–2.49 low satisfied, 2.50–3.49 medium satisfied, 3.50–4.49 high satisfied, and 4.50–5.00 highest satisfied. Moreover, coding, frequency counting, and percentages were utilized to analyse the qualitative data.

### *Phase 2: The Experiment of Using the Board Game “Live Your Life” to improve Undergraduate Students’ Quality of Life*

A quasi-experimental research study using a non-equivalent control group pretest-post-test design was conducted to evaluate the QOL of students playing the game version 2. This phase, using the quasi-experimental design, employed the control group to ensure that the change in the QOL came from the influence of the developed board game.

#### *Participants*

The participants in this phase were students who were purposive sampling from the Faculty of Education of one of the universities in Bangkok, Thailand, in the same nine fields mentioned in phase 1 during January 2024. The inclusion and exclusion criteria were the same as in the first phase.

Finally, there were 65 participants. The samples were randomly assigned and treated in four groups. Group 1 consisted of 18 students who played versions 1 and 2 of the game. Group 2 contained 16 students who did not play either version. Group 3 consisted of 15 students who played version 1 and studied a QOL document. Group 4 had 16 students who did not play either version of the game but did study the QOL document.

### Measurement

In phase 2, we used the second version of the board game for the experimental group, refined based on feedback from the samples in phase 1 and approved by five experts in recreation, health education, educational technology, education, and finance (IOC = 0.80–1.00), along with a QOL document for the control group. The other tools, which included a QOL questionnaire, a satisfaction questionnaire, and a group discussion recording form, were the same as those used in the previous phase.

### Data Analysis

A dependent sample *t*-test was employed to determine the significance difference in QOL before and after the experimental group played boardgame version 2, while the control group studied the QOL document. The one-way analysis of variance was also utilized to test for differences in QOL among the groups. For pairwise comparisons, Fisher's least significant difference (LSD) was used. We used the same analysis method as previously mentioned for the students' satisfaction and the qualitative data.

We collected the data for the first phase from December 2022 to February 2023. For the second phase, data were

collected from December 2023 to February 2024. The students who gave their consent to participate in the research joined a social media group using the Line application, which facilitated efficient communication between them and the researchers. Each student signed a consent form, and after that, they either played the game or studied the QOL document. At the end of the process, the data were collected.

## Results

### *The Pilot Study of the Board Game "Live Your Life" to Enhance Undergraduate Students' Quality of Life*

In phase 1, most of the samples were female students (63.64%), with an age range of 19–23 years. Of all the students, the majority were 20 years old (45.50%). All of the players were studying in the Faculty of Education of one of the universities in Bangkok, Thailand, either in their second year (51.52%) or third year (42.42%). The participants covered all nine fields; however, the majority was economics education (15.15%). Most students played the game eight times (44.44%) and spent approximately one hour playing each time. The average QOL score after playing version 1 of the board game was significantly higher than before ( $t = 3.14, df = 32, p = .004$ ) (as shown in Table 1).

Most students (81.82%) agreed that version 1 promoted QOL, whereas 6.06 percent did not agree and 12.12 percent were unsure. The students considered that the game promoted QOL most for the psychological (36.36%), social (30.30%), and level of independence (15.15%) domains (as shown in Table 2).

**Table 1** Comparative analysis of QOL scores before and after playing the game

Group	<i>n</i>	Before playing		After playing		<i>df</i>	<i>t</i>	<i>p</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Played version 1	33	3.80	0.42	3.99	0.33	32	3.14	.004*

Note: \* $p < .05$ .

**Table 2** The impact of the first version of the board game on the QOL

Topic	Frequency	%
QOL was promoted after playing the board game		
Yes	27	81.82
Not sure	4	12.12
No	2	6.06
Total	33	100.00
QOL based on domains was promoted after playing the board games		
Psychological	12	36.36
Social	10	30.30
Level of independence	5	15.15
Physical	4	12.12
Environment	2	6.06
Spirituality/religion/personal beliefs	0	0.00
Total	33	100.00

Furthermore, the students noted that after playing this game, they wanted to recommend it to other friends. They also indicated that playing this game helped them know how to promote their own QOL and others, making them feel better about themselves, gaining better social relationships, having physical power, and living more happily in the environment than before. Additionally, students were highly satisfied with the game, both in terms of overall satisfaction, usefulness of the content, and strength and durability. They illustrated that they were most satisfied with the content of the board game: the social aspect of personal relationships ( $M = 4.24$ ,  $SD = 0.56$ ), the psychological aspect of self-esteem ( $M = 4.21$ ,  $SD = 0.60$ ), the social aspect of practical social support ( $M = 4.12$ ,  $SD = 0.74$ ), and the psychological

aspect of thinking, learning, memory, and concentration ( $M = 4.12$ ,  $SD = 0.65$ ) (as shown in Table 3).

All students (100%) enjoyed playing the game, and 87.88 percent considered the name of the board game (“Live Your Life”) appropriate. Students reported that playing the game was beneficial for the planning and administration of life skills (60.61%), with knowledge gained from playing being planning skills (45.45%) and creating a balance in their lives (42.42%). However, most students (21.21%) wanted an easier game to play. Some feedback examples are provided below.

Student 1: “The game helps us to think and plan before playing each round; it makes us feel the need to be careful.” “Players need to consider the potential consequences of each activity they engage in.” “Use your mind to see what others will do and what you should do.”

**Table 3** Students’ satisfaction with the content of version 1 based on domain ( $n = 33$ )

Domain	<i>M</i>	<i>SD</i>	Level
<b>Social</b>			
Personal relationships	4.24	0.56	High
Practical social support	4.12	0.74	High
Supported or managed activities	4.06	0.86	High
<b>Psychological</b>			
Self-esteem	4.21	0.60	High
Thinking, learning, memory, and concentration	4.12	0.65	High
Positive feelings	4.06	0.61	High
Bodily image and appearance	3.64	0.78	High
Negative feelings	2.39	1.14	Low
<b>Level of independence</b>			
Mobility	4.09	0.63	High
Activities of daily living	4.06	0.70	High
Work capacity	4.06	0.70	High
Communication ability	3.85	0.71	High
Dependence on medication and treatment	2.42	1.30	Low
Use of drugs, cigarettes, alcohol	2.18	1.18	Low
<b>Environment</b>			
Participation in and opportunities for recreation/leisure	4.09	0.68	High
Opportunities for acquiring new information and skills	4.00	0.71	High
Physical environment (pollution/noise/traffic/climate)	4.00	0.79	High
Physical safety and security	3.88	0.82	High
Health and social care: availability and quality	3.85	0.80	High
Home environment	3.67	0.99	High
Transport	3.64	0.82	High
Financial resources	3.58	0.94	High
<b>Physical</b>			
Using the senses	4.09	0.77	High
Sleep and rest	3.48	1.03	Medium
Energy and fatigue	3.39	0.90	Medium
Sexual activity	2.76	0.97	Medium
Pain and discomfort	2.67	1.16	Medium
<b>Spirituality/religion/personal beliefs</b>			
Spirituality	3.97	0.81	High
Personal beliefs	3.70	0.98	High
Religion	3.21	1.22	Medium

Student 2: “It is a mind-changing game. Each person in the game employs unique planning skills, highlighting the importance of managing certain aspects of life effectively. It is an activity that requires you to guess others’ thinking all the time.”

Student 3: “Playing games is planning by using thinking process skills. It can be applied to routine life in society because it is similar. The game is a practice for living in real society in the future. Talking, sharing, and helping people who play together get you to socialize and interact in a good way.”

Student 4: “Acquiring knowledge that people cannot work or study alone or gain only good health. Everything must go together. If I don’t have good health, I won’t be able to earn money. If I don’t have money, I won’t be able to study. If I don’t study, I won’t have the knowledge to win over others.”

Student 5: “I have observed myself playing. Then, I compared our lives to today’s society: flexibility in living, adaptability to suit the environment, and work/study life balance. The game teaches us to plan how to do different things from the playing characters. Therefore, I had a chance to think and plan every time I got to play this game.”

The researchers further developed the game in version 2, based on feedback from phase 1. All five experts agreed that the board game design was appropriate, although one expert commented that it might take a long time to play because of the time needed to understand the rules. We needed to clearly adjust the system for buying and selling shares. In total, four experts agreed that the game content was appropriate, while three experts considered that each aspect of QOL was appropriate. In addition, the experts suggested a concluding explanation at the end of the game to enhance understanding of a better QOL. Overall, they deemed it a good board game, despite the initial difficulty in understanding how to play, which they overcame after about one or two rounds. An expert noted that the game might not directly improve QOL but rather was focused on training players’ thinking process skills (cognitive skills) to lead to the development of QOL in the context of personal relationships.

### *The Experiment of Using the Board Game “Live Your Life” to Improve Undergraduate Students’ Quality of Life*

In phase 2, 65 students from the Faculty of Education of one of Bangkok’s universities participated. Of the 34 students who participated in the board game version 2, the majority (88.00%) were female, with ages ranging from 19 to 23 years. Of all students, the majority were aged 22 (29.40%). Most of them were studying in their 4th year (47.10%). The percentage of the field of study was quite equal, and each major had at least three students, while the majority was teaching Thai (14.71%). Most students played version 2 once (38.24%) and three times (32.35%), spending an hour each time (38.24%). The other 31 students who studied the QOL document group were mostly female (80.64%), aged between 19 and 24 years, with the majority aged 19 (38.70%). Most of them were studying in their first year (41.93%). The participants from each major were at least three students, except for physical education, which was four (12.90%).

The results indicated that after the experiment, the QOL increased significantly at a level of 0.01 for Group 1 who played the board game versions 1 and 2, Group 2 who played the board game version 2, and Group 3 who played the board game version 1 and studied the QOL document. Meanwhile, in Group 4 studying the QOL document, the QOL increased by a significant level of 0.05 (as shown in Table 4).

Considering the mean comparison among groups, the QOL scores for the four student groups were not significantly different before the experiment ( $F (df1 = 3, df2 = 61) = 1.597, p = .199$ ). However, after participating, the one-way analysis of variance indicated that the QOL scores were significantly different in at least one group ( $F (df1 = 3, df2 = 61) = 2.888, p = .043$ ). The pairwise comparison analysis using the LSD method (homogeneity of variance: Levene statistic 1.106,  $p = .354$ ) indicated that students who played version 1 and studied the QOL document had higher QOL scores than students who only studied the QOL document. Students who played versions 1 and 2 also had higher QOL scores than those who studied the QOL document (as shown in Table 5).

**Table 4** Comparative analysis of QOL scores before and after the experiment by each group

Group	n	Before		After		df	t	p
		M	SD	M	SD			
Group 1: Played version 1 and version 2	18	3.71	0.48	4.20	0.33	17	4.927	.000**
Group 2: Played version 2	16	3.81	0.42	4.05	0.34	15	3.046	.008**
Group 3: Played version 1 and studied QOL document	15	3.94	0.33	4.21	0.29	14	3.532	.003**
Group 4: Studied QOL document	16	3.62	0.46	3.91	0.38	15	2.576	.021*

Note: \* $p < .05$ , \*\* $p < .01$ .

**Table 5** The one-way ANOVA and pairwise comparison of the QOL

Source of variances	SS	df	MS	F	p
Between group	0.981	3	0.327	2.888	.043*
Within group	6.905	61	0.113		
Total	7.885	64			

Group	M	Group 1	Group 2	Group 3	Group 4
Group 1	4.20	-	.14524	-.01619	.28810*
Group 2	4.05	-	-	-.16143	.14286
Group 3	4.21	-	-	-	.30429*
Group 4	3.91	-	-	-	-

Note: \* $p < .05$ .

Most students (85.29%) agreed that the board game version 2 promoted QOL, while only 2.94 percent did not agree, and 11.76 percent were not sure. The students considered that the game promoted QOL most for levels of independence (35.29%), psychological (26.47%), and social (17.65%) aspects (as shown in Table 6).

Furthermore, the students who played the board game version 2 also noted that they wanted to recommend it to other friends, and playing this game elevated them in many aspects, such as the QOL, social relationships,

physical power, and happiness. The priority of satisfaction for the board game version 2 was that students were highly satisfied, both in terms of overall satisfaction, the graphics, and the usefulness of the content. They illustrated that they were most satisfied with the content of the board game: the psychological aspect of thinking, learning, memory, and mindfulness ( $M = 4.35$ ,  $SD = 0.73$ ); the psychological aspect of self-esteem ( $M = 4.29$ ,  $SD = 0.80$ ); and the physical aspect of using the senses ( $M = 4.26$ ,  $SD = 0.83$ ) (as shown in Table 7).

**Table 6** The impact of the second version of the board game on the QOL

Topic	Frequency		Total	%
	Group 1	Group 2		
QOL was promoted after playing the board game.				
Yes	16	13	29	85.29
Not sure	2	2	4	11.76
No	0	1	1	2.94
Total	18	16	34	100.00
QOL based on domains was promoted after playing the board games.				
Level of independence	6	6	12	35.29
Psychological	5	4	9	26.47
Social	5	1	6	17.65
Physical	1	4	5	14.71
Environment	0	1	1	2.94
Spirituality/religion/personal beliefs	1	0	1	2.94
Total	18	16	34	100.00

**Table 7** Students' satisfaction with the content of version 2 based on domain ( $n=34$ )

Domain	Group 1 ( $n = 18$ )			Group 2 ( $n = 16$ )			Total ( $n = 34$ )		
	M	SD	level	M	SD	level	M	SD	level
Psychological									
Thinking, learning, memory, and concentration	4.39	0.85	High	4.31	0.60	High	4.35	0.73	High
Self-esteem	4.56	0.62	Highest	4.00	0.89	High	4.29	0.80	High
Positive feelings	4.22	0.81	High	4.00	0.73	High	4.12	0.77	High
Bodily image and appearance	4.22	0.88	High	3.94	1.00	High	4.09	0.93	High
Negative feelings	2.39	1.38	Low	2.19	1.05	Low	2.29	1.22	Low
Physical									
Using the senses	4.39	0.70	High	4.13	0.96	High	4.26	0.83	High
Sleep and rest	3.50	1.29	High	3.38	1.15	Medium	3.44	1.21	Medium
Energy and fatigue	3.28	1.23	Medium	3.25	1.13	Medium	3.26	1.16	Medium
Sexual activity	2.50	1.34	Medium	2.56	1.09	Medium	2.53	1.21	Medium
Pain and discomfort	2.50	1.34	Medium	2.50	1.26	Medium	2.50	1.29	Medium

**Table 7** Continued

Domain	Group 1 (n = 18)			Group 2 (n = 16)			Total (n = 34)		
	M	SD	level	M	SD	level	M	SD	level
Level of independence									
Work capacity	4.44	0.70	High	4.00	0.97	High	4.24	0.85	High
Activities of daily living	4.33	0.69	High	3.94	0.93	High	4.15	0.82	High
Communication ability	4.17	0.86	High	4.06	1.06	High	4.12	0.95	High
Mobility	4.33	0.69	High	3.75	1.18	High	4.06	0.98	High
Dependence on medication and treatment	2.06	1.59	Low	2.81	1.28	Medium	2.41	1.48	Low
Use of drugs, cigarettes, alcohol	1.39	1.38	Lowest	2.38	1.50	Low	1.85	1.50	Low
Social									
Personal relationships	4.28	0.67	High	4.19	0.91	High	4.24	0.78	High
Practical social support	4.33	0.91	High	3.81	1.05	High	4.09	1.00	High
Supported or managed activities	4.06	0.94	High	3.81	0.98	High	3.94	0.95	High
Environmental									
Opportunities for acquiring new information and skills	4.44	High	High	3.94	High	High	4.21	0.81	High
Participation in and opportunities for recreation/ leisure	4.17	0.79	High	4.06	1.00	High	4.12	0.88	High
Financial resources	4.22	0.94	High	3.94	1.00	High	4.09	0.97	High
Physical environment (pollution/ noise/traffic/ climate)	3.78	1.11	High	4.00	0.97	High	3.88	1.04	High
Health and social care: availability and quality	3.67	1.14	High	4.06	0.93	High	3.85	1.05	High
Home environment	3.72	1.32	High	4.00	0.97	High	3.85	1.16	High
Physical safety and security	3.83	1.10	High	3.75	1.18	High	3.79	1.12	High
Transport	3.56	1.29	High	3.63	1.20	High	3.59	1.23	High
Spirituality/religion/personal beliefs									
Spirituality	4.22	0.81	High	3.88	0.89	High	4.06	0.85	High
Personal beliefs	3.72	1.02	High	3.44	0.89	Medium	3.59	0.96	High
Religion	3.22	1.00	Medium	3.19	0.83	Medium	3.21	0.91	Medium

All the students enjoyed playing the board game version 2, and many students (91.18%) commented that the name of the game was appropriate but may not be attractive. Most students (61.76%) considered the game a good educational tool as well as being fun to play, with attractive game playing, and the knowledge gained from playing was about creating a balance in life and improving the QOL of students (64.71%). Some feedback examples are provided below.

Student 1: "Understanding your own life always requires analysing skills, creating physical balance, and maintaining balance in life."

Student 2: "There is a high level of psychological thinking. Know how to restrain yourself."

Student 3: "The game offers players a significant amount of flexibility in their gameplay. The game strikes a balance between using luck to play and using the head to think and plan, which is quite good. The game accurately embodies the concept of "Live Your Life."

Student 4: "Knowledge regarding use, as this game helps us realize that sometimes we must find happiness in life. Working hard and earning a lot of money doesn't always guarantee happiness."

Student 5: "Gain knowledge about balancing in life. The board game is based on various events or activities that we carry out in our daily lives."

## Discussion

The key findings revealed that students who played versions 1 and 2 of the board game, as well as those who played version 1 and studied the QOL document, significantly improved their QOL compared to the control group, indicating a high level of satisfaction with the game. The development of the board game took into account the needs of the students, and its mechanism and conditions fostered a balance between study, work, and other activities in the students' lives. This was the key to understanding how the developed board game could enhance students' quality of life. As supported by Chotratanakamol et al. (2023), study-life balance was an important factor in the success and well-being of university students. In line with this, the relationship between the social roles carried out in occupational work and in personal life could be evaluated based on an individual's satisfactory, conflict-free, harmonious, and efficient functioning in both the private and work areas (Rantanen et al., 2011). Some studies found that a low work-life balance could be harmful to health because it leads to lower mental and physical health levels (Borowiec & Drygas, 2023). Stress and poor time

management could lower work-life balance (Tan-Wilson & Stamp, 2015). Therefore, the board game that taught students to balance their strengths could potentially improve their QOL.

Additionally, the game's context encouraged students to think critically in order to win, and it required them to interact with their friends during gameplay. This was also one of the factors enhancing the QOL. Open-minded, integrative, and collaborative learning could affect higher-order learning behaviors (Liu et al., 2023). A disposition to critical thinking was required to control impulsive behavior (Liu et al., 2021). Furthermore, a study revealed that students who played the game with friends or engaged in related social activities were able to reduce stress and the impact of negative memories (Leblanc & Ramirez, 2020), and that playing with mindfulness could reduce trait anxiety (Stinson et al., 2020). Thus, the developed board game could help students balance their lives with high satisfaction from the psychological aspect, leading to improved QOL.

However, certain aspects still required attention. Despite the fact that the students who only played the second version of the board game had a significantly higher QOL score after playing the game, their QOL scores did not differ from those of the control group. The results indicated that the development of QOL required a long period of time. The students who played both versions of the board games, as well as those who played version 1 and studied the QOL document, had more time to develop their QOL than the group that only played version 2. It led to the discussion that, in order to develop students' QOL and achieve significantly higher scores compared to a control group, sufficient time was a crucial factor. To enhance the quality of life (QOL) of students, one could either use a board game or integrate the QOL document. However, it is not advisable to solely rely on the QOL document, as the study's findings do not conclusively show that studying the QOL document, which requires significant time, can improve the students' QOL. Therefore, this study's limitations should be taken into consideration.

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## Conclusion and Recommendation

After playing the game, the students had significantly increased their QOL. The gameplay provided direction for students to balance their lives and win the game. To achieve the best QOL, students should play the game and study the QOL document. For implementation, teachers or health educators should utilize the game

and QOL document in health classes to emphasize the significance of health and knowledge, encouraging students to enhance their QOL through health promotion and health studies. Moreover, this game employs simulated strategies that might be suitable for stimulating students' thinking involved in complex play. According to the study's results, the board game has the potential to enhance QOL, but its impact on QOL still has certain limitations. We should prioritize the longitudinal study, which focuses on the students' ability to retain the QOL. Furthermore, this study developed a board game for face-to-face play; however, as technology advances and we prepare for uncertain situations like the pandemic, we should also create a digital board game.

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## Conflict of Interest

There were no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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