***The Application of Analytic Hierarchy Process for the Evaluation of Imaginative
Teaching Strategies***

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Abstract
As the advocacy for and importance of imagination is increasingly emphasized
around the world, a mass fervor for imaginative education has sprung up in Taiwan.
In the domain of arts and design education, imagination means the source of creative
designs; a variety of teaching plans that arouse and promote imagination are required
to enhance students' creativity and imagination. Therefore, the study aims at
developing imaginative teaching strategies to achieve the effect of strengthening
students' imagination. After developing the teaching strategies and teaching contents
through field interviews, AHP questionnaires were distributed to assess the weights of
teaching strategies and teaching contents. Analysis showed both consistency ratio
(C.R.) and consistency ratio of the hierarchy (C.R.H.) for all items were smaller than
0.1, which conforms to the requirement of the Analytic Hierarchy Process (AHP)
theory. Research results indicated the priority of teaching strategies that stimulate
students' imagination were: stimulation of imagination activities, stimulation of
imagination materials, stimulation of imagination pedagogy, stimulation of
imagination space, stimulation of imagination personage; overall speaking, the
teaching content that encourages participation in "competitive activities" had the
greatest weight in stimulating students' imagination.

Keywords: Imagination, Teaching Strategy, Teaching Activity, Teaching Content.

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Introduction

Imagination is an innate power, from which individualized accomplishments can be achieved when exerted to the highest degree (Labuske & Streb, 2008; Richard & Jim, 2005). Classical masterpieces in the area of arts and literature, painting, architecture, etc. come about from the unrestrained liberal imagination of the originators. As the results of such imagination continue to accumulate, they converge to form civilizations, and human beings continue to exert their imagination under the influence of civilizations, adding new elements to create even more innovative pieces that are passed onto later generations. In the process of stimulating imagination, observation and past experience were combined to generate great creativity and inspiration through the effects of imagination; consequently, more innovative and stylish design works are created (Chang, H. T., & Lin, T. I., 2013).

Einstein said "imagination is more important than knowledge," because knowledge is limited but the invisible imagination can overlook everything in the world, constituting the progressive power. Guiding students to bring imagination into play for the objective of generating creative works is an essential part in the design curriculum. Education philosopher Greene (1995) proposed that arts may help release students' imagination. In an aesthetically rich teaching experience, "imagination" plays an important role in interpreting the world and creating a brand-new world.

However, a study of imagination that discusses only imagination tends to be vague and not specific enough. Imagination will have greater practical value and maximized benefits only when it is specifically put into practice (Amabile, 1983).

Many research results of previous studies （Egan,1992; Liang 2012; Liao,2014） showed that imagination can be cultivated, and the cultivation of imagination requires a process of systematic teaching, which turns theoretical concepts and techniques into explicit knowledge to be passed on to learners. In view of this, this study intends to conclude various imaginative teaching strategies and teaching contents by identifying factors that stimulate imagination. Subsequently, the AHP is applied to find out the weights of various teaching contents, which are expected to be incorporated with relevant teaching strategies into the "computer graphics" courses in technical colleges. This is expected to achieve the objective of enhancing the graphical imagination and practicing skills of senior vocational school students, and further refine the quality of teaching. Research objectives of this study include the following:

1. Explore factors that stimulate students' imaginations.
2. Explore teaching strategies that stimulate students' imaginations.
3. Explore teaching contents that stimulate students' imaginations.

Literature Review

1. Factors affecting imagination

In the process of growth and learning, factors affecting students' learning are very complicated. The factors may be roughly distinguished into three categories: 1. Personal factors: intelligent capability, self-concept, learning motivation, learning attitude and habits, and personal beliefs, etc.; 2. Family factors: socio-economic level

of family, parents' expectations, parents' educational philosophy, and parenting approach, etc.; 3. School factors: teachers' curriculum design, teaching strategies, personality traits, classroom management, and the school's equipment, etc. (Domina, 2005; Yu, M. N., 2006)

Factors that affect the functioning and development of imagination are similar. Passmore (1985) believed that teachers should bring alternative approaches to thinking and diversified life experiences for students, breaking through the conventional beliefs and increasing the probability of creating novel things. Büscher et al. (2004) sought to identify the best combination of work environment, tools to be used, and work content for designing job in different domains. Karwowski and Sosynski (2008) echoed the above study, stating that imagination education must be linked with the students' interests and habits, and on this basis, the researchers developed a training activity that features a role playing game.

From previous studies, researchers believe that apart from the school factors, family background also strongly affects students' learning accomplishments (Tsai, Gates and Chiu, 1994; Luoh, M. C., 2004), and thus some studies have focused on the influence of family background on individuals' learning results; for example, the influence of parents' educational level, occupation, and family income on students' learning results.

In the Equality Of Education Opportunity report (Coleman et al., 1990) proposed by J.S. Coleman and others in 1966, it is stated that school resources had a limited influence on students' learning results; instead, non-school factors had a greater influence; students coming from families of higher socio-economic status tend to have relatively better performances in learning results.

Moreover, Mushtaq (2012) believed that a family may pass on to their children language ability and cultural competence, and these two capabilities represent a person's cultural capital. School education mainly imparts the mainstream culture of the society. A better family background means one may acquire a more abundant cultural capital, and hence learn the mainstream culture taught in school with a higher proficiency. Therefore, people with more abundant cultural capital will achieve better learning results in school, and hence attain a higher social status; the family's social status is thus replicated. Therefore, it can be easily seen that cultivation of imagination is closely and interactively related to a person's family environment and learning environment.

In terms of recreational activities, Godbey (1988) believed participation in activities is an important part of modern life. Moderate participation may promote the generation of positive emotions, and hence affect health. One may acquire a sense of competence, sense of mastery, and sense of self-esteem, and hence develop the personality trait of self-determination through a high level of participation in recreational activities. When a person can make his/her own choice of activities, he/she will acquire a sense of freedom and satisfy his/her inherent motives. This helps maintain a sense of self-control, thereby one may cope with the stress of life and be inspired with all sorts of imagination.

2. Imagination teaching strategies

The term "imagination" means boundless thinking, but how can this abstract concept be measured? This difficult problem can only be solved through different levels of assessment.

Many scholars tried to enhance students' creativity through thinking training in earlier times. This includes the Cognitive Researching Trust (CoRT) proposed by De Bono who invented lateral thinking (1976). This program comprises six parts, each with 10 sessions which cover wide-ranging topics, such as breadth, organization, interaction, creativity, information and affection, and action. The program may guide students' thoughts, help them observe more than the surface or immediate aspects of things, and develop broader perceptions and thinking skills, and thereby more appropriate decisions can be made.

Moreover, the formerly U.S.S.R. inventor Genrich Saulovich Altshuller initiated the TRIZ in 1946. He led the TRIZ research team consisting of dozens of research institutes, universities, and enterprises, and through decades of analysis and research of top-notch inventions and patents around the world (cumulated to 2.5 million pieces), he developed the basic theory about invention issues based on dialectical materialism and system theory. The core of his theory comprises the basic theory and principle, and the particulars include: the general theory (basic rules, method of contradiction analysis, grades of inventions), technology evolutionism, 39 common engineering parameters of solutions to technological problems and 40 methods of invention, substance-field analysis and conversion principle with 76 standard solutions, problem-solving procedures of invention issues, and a physical effects database. TRIZ represents an integrated body of theories that encompasses solutions to technological problems, various approaches and algorithms of practical and innovative R&D.

Eberle (1971) made reference to Osborn's checklist and proposed a kind of checklist technique, which may be literally translated as "SCAMPER". In fact, it consists of seven English words, representing seven directions of improvement or change, which help the conception of new ideas. The seven directions are:
(1) S-Substitute: Consider what things, persons or elements can be substituted.
(2) C-Combine: Consider combining or blending with other things or services and becoming one.
(3) A-Adapt: Consider if adaptation is necessary; for example, changing a function or using a part of another thing.
(4) M-Modify: Adding or deleting specifications, changing shape, or modifying color tones, etc.
(5) P-Put to another use: Consider if there is any other unconventional use.
(6) E-Eliminate: Can the original thing be reduced in size? Extracted? May some parts of it be omitted? Can it be made more comprehensive and more refined?
(7) R-Reverse: Re-organizing or re-arranging the original order. Or swapping the opposite position.

Karwowski developed the Test of Creative Imagination (TCI) in the early 1990s. The test content includes 16 main components – 4 straight lines, 4 semi-circles, 4 points, and 4 curve line segments. Test subjects can be scored for their fluency, originality,

and flexibility, which in turn may evaluate the subjects' creative imaginations (Karwowski & Soszynski, 2008).

In order to make imagination more assessable, Trotman (2006) listed the following ways to manifest imagination: 1. Observe students' emotions, behaviors, and responses; 2. Record conversations; 3. Observe students' interactions; 4. Collect students' writing and diaries; 5. Keep photo records; 6. Use of pictures and images; 7. Use of animations, videos, and stories; 8. Dance; 9. Compose music; 10. Extemporaneous creations and extemporaneous speaking.

In the Two-Factor Imagination Scale (TFIS) compiled by Thompson (2011), he distinguished the effect, process, and mechanism of imagination in the form of a questionnaire, so that respondents would understand their own type of imagination.

Liang (2013) listed ten indicators for evaluating imagination, which were "interdisciplinary", "effective", "figurative", "dialectical", "abundant", "innovative", "intuitive", "sensitive", "focused", "explorative", and on this basis, ten evaluative questions were developed corresponding to these ten indicators.

It can be seen from the above literature review that in the scenario of a computer graphics course, students' understanding of the course content, their personality traits, and differences in learning attitudes can be potential influencing factors, but teachers' delivery approach and responsiveness are even more critical factors that lead to success. Teachers must adjust their teaching strategies when facing students with poor design capability and inadequate creativity and imagination, so as to improve the results of teaching that do not live up to expectations. Many school teachers in the U.S. are gradually adjusting their teaching strategies and orientation now, adopting a tolerant approach and stressing high-level thinking skills to guide students' learning (Stenberg & Lubart, 1995). Despite its being an abstract concept of individuality and creativity, imagination and its performance can still be evaluated through such methods as systematic teaching, testing, and learning records.

Research Design

1. Research framework

To achieve the research objectives, this study's research framework is designed based on the literature review and Fuzzy Analytic Hierarchy Process (FAHP), as shown in Figure 1. Researchers tried to understand the factors that stimulate imagination first, and devised imagination-inspiring teaching strategies through field interviews. Then, the FAHP was adopted to obtain the relative weights for various teaching strategies and contents, and eventually teaching plans were developed.
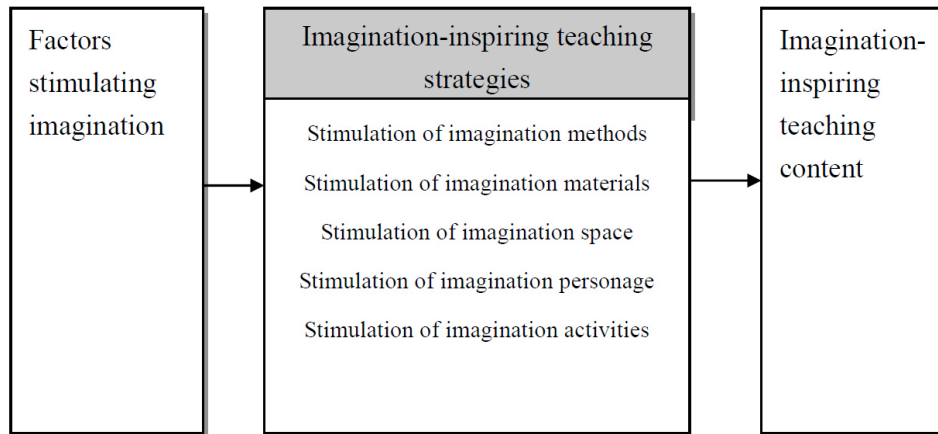
Figure 1 Illustration of the research framework

2. Research methods and subjects

(1) Field interview

Field interviews with experts were employed in this study. First of all, relevant literature was reviewed and collected to serve as a reference for the interview content. Then, interviews were conducted with experienced teachers of design-related departments in technical colleges, and by recording, organizing, and analyzing the interview contents, opinions about factors stimulating students' imaginations were concluded.

Interviewees were teachers with more than ten years of teaching experience in design-related disciplines in northern, central, and southern Taiwan. A total of seven interviewees were chosen, and their background information is listed in Table 1 below:

Table 1 Basic information about the interviewees of the field interviews

No.	Sex	Serving institution	Professional title
I1	F	Department of Industrial and Commercial Design, National Taiwan University of Science and Technology	Associate Professor
I2	M	Department of Industrial Design/Graduate Institute of Innovation and Design, Taipei University of Technology	Associate Professor
I3	M	Department of Arts and Design, National Taipei University of Education	Associate Professor
I4	M	Department of Graphic Communication Arts, National Taiwan University of Arts	Associate Professor
I5	M	College of Design, Ling Tung University	Associate Professor
I6	F	Department of Product and Media Design, Fo Guang University	Associate Professor
I7	M	Department of Visual Communication Design, Southern Taiwan University of Science and Technology	Associate Professor

(2) Questionnaire survey

This study is an assessment tool for computer graphics courses oriented towards developing imagination teaching. With the AHP questionnaire survey method, the AHP questionnaire as well as the literature review and experts' questionnaire were used as the basis for indicative perspectives and items after question adjustment, and then the "AHP Questionnaire for the Stimulation of Imagination Teaching Strategies" was developed by collecting experts' opinions to develop teaching strategies for computer graphics courses that stimulate students' imaginations.

14 teachers from technical and vocational colleges with 5 years or more of experience in teaching computer graphics-related courses were selected and the questionnaires were distributed. Information about the subjects of the questionnaire survey is listed below in Table 2.

Table 2 Basic info of AHP questionnaire survey subjects

No.	Sex	Serving institution	Professional title
Q1	F	National Taiwan University of Science and Technology	Associate Professor
Q2	M	Taipei University of Technology	Associate Professor
Q3	M	Ming Chuan University	Associate Professor
Q4	M	Taiwan University of Arts	Associate Professor
Q5	M	Ling Tung University	Associate Professor
Q6	F	Hsing Wu University	Associate Professor
Q7	M	Southern Taiwan University of Science and Technology	Associate Professor
Q8	M	Shu-Te University	Assistant Professor
Q9	M	Shu-Te University	Assistant Professor
Q10	M	China University of Technology	Professor
Q11	M	China University of Technology	Assistant Professor
Q12	M	National Taipei University of Education	Assistant Professor
Q13	M	Taibei High School	Director
Q14	M	Taibei High School	Teacher

Bozbura, F. T., Beskese, A., & Kahraman, C. (2007) believed the Fuzzy AHP may be used for research questions that are difficult to quantify, including business strategies of immature but emerging industries, the social science perspective of the resource allocation priority, etc. Currently, imagination education is at an immature stage of development in Taiwan, and therefore, the AHP questionnaire was adopted in this study to analyze the weights among various teaching strategies.

The questionnaire was designed as a comparative 9-point scale (9:1 to 1:9), where paired comparisons were conducted for same-level indicators. Data obtained were used to create a comparison matrix, from which the relative weights among the factors can be derived, and the AHP for stimulation of imagination teaching strategies can be developed.

The application of the AHP is divided into two parts, namely, the establishment of hierarchy and the evaluation of hierarchy. When using the AHP, complicated questions are assessed by experts and scholars to identify the essential factors, which are then expressed in a simple hierarchical structure. Afterwards, an assessment scale is used to conduct paired comparisons of factors and establish a matrix, and then the eigenvectors are derived. Comparisons are then made to find out the order of the hierarchical factors. Next, the consistency of the paired comparison matrix is tested to ensure it is free of errors and may be used as a reference. In the AHP, consistency is tested mainly with the Consistency Index (C.I.) and Consistency Ratio (C.R.). The value of the C.I. represents consistency of earlier and later judgments, with a C.I.>0 meaning inconsistent judgments. Saaty (1980) suggested that the C.R. should be smaller than or equal to 0.1 to indicate an acceptable level of consistency.

3. Research tools

(1) Open-end expert questionnaire for the stimulation of imagination teaching strategies
To enhance imagination of students in design-related departments, the following five teaching strategies were sorted out from the results of the literature review. Table 3 summarizes these teaching strategies that can be applied to teaching scenarios.

Table 3 Outline of expert questionnaire

Perspectives	Interview briefing
Stimulation of imagination methods	E.g.: Flipped classroom approach, cooperative learning, etc. Please provide teaching methods that you think may help stimulate imagination.
Stimulation of imagination materials	E.g.: Award-winning advertisement posters, photographs, new-media animation, etc. Please provide teaching materials that you think may help stimulate imagination.
Stimulation of imagination spaces	E.g.: Exhibitions, large parks, etc. Please suggest spaces that you think may help stimulate imagination.
Stimulation of imagination personages	E.g.: New artists, students in different disciplines, friends who are 10 years older and younger than oneself, etc. Please suggest people who you think may help stimulate imagination.
Stimulation of imagination activities	E.g.: Earning a sport certificate, learning a new thing, reading a new book, listening to never-heard before music, etc. Please provide activities that you think may help stimulate imagination.
Others	Please give supplementary comments on other teaching methods that may help stimulate imagination.

(2) AHP questionnaire for the stimulation of imagination teaching strategies
To analyze the weights and order of the stimulation of imagination teaching strategies, relevant information was collected based on the results of the field interviews, which served as the basis of the questionnaire for establishing the self-developed structured "AHP Questionnaire for the Stimulation of Imagination Teaching Strategies".

In the questionnaire, items were selected for specific hierarchies, and frequencies of commonly seen questions were compared. The questionnaire was designed to be answered with a 9-point scale for paired comparisons among the selected items.

Teaching strategies developed in this study were divided into two levels – "teaching content" and "teaching substance". "Teaching content" included "teaching methods", "teaching materials plans", "stimulate of imagination spaces", "stimulation of imagination personages", and "stimulation of imagination activities".

The levels of "teaching content" discussed included practice-oriented, inspiration-oriented, game-oriented, cooperation-oriented, temperament-oriented, individual-oriented, audio-visual animation, graphics and text, current news, nature, outdoor, indoor, arts domain, non-arts domain, virtual characters, negative figures, competition, adventure, performance, outdoor visit, and recreation, with a total of 21 items. The hierarchical structure is illustrated in Figure 2:

Stimulation of imagination teaching strategies				
Teaching methods	Teaching materials plans	Spaces	Personages	Activities
▼	▼	▼	▼	▼
Practice-oriented	Audio-visual animation	Nature	Arts domain	Competition
Inspiration-oriented	Graphics and text	Outdoor	Non-arts domain	Adventure
Game-oriented	Current news	Indoor	Virtual characters	Performance
Cooperation-oriented			Negative figures	Visit
Temperament-oriented				Recreation
Individual-oriented				

Figure 2 Hierarchical framework for the stimulation of imagination teaching strategies

4. Data processing

Teaching strategies	Interview results	General summary
Stimulation of imagination methods	I1: Interdisciplinary cooperative teaching, Context Mapping approach I2, I3: Brainstorming, IDEO innovative thinking, World Café approach I4: Demonstration teaching, industry-academia cooperation I5, I7: Cooperative learning, teaching with cases, team teaching, inspirational teaching I6: Game approach, scenario demonstration, critics, etc.	Practice-oriented Inspiration-oriented Game-oriented Cooperation-oriented Temperament-oriented Individual-oriented
Stimulation of imagination materials	I1: Life experience scenarios, natural structures and materials I2, I3, I4: Award-winning pieces in international design competitions, stimulating imagination by identifying inconveniences or problems in life. I5: Technological products I6, I7: Movies, music, topics from current affairs, living environment	Audio-visual amination Graphics and text Current news
Stimulation of imagination spaces	I1: Design targets and user spheres, jumping out of the daily conventional sphere I2, I3, I5, I6: Approaching nature, design-related exhibitions, museums, art galleries I4: Subjective experiential spaces, cultural and creative zones, professional bookstores, professional interest groups I7: Train stations, cinemas, crowded public spaces	Nature Outdoor Indoor
Stimulation of imagination personages	I1: Extreme users, story-tellers I2: Jimmy Liao, interdisciplinary community members mutually stimulating imagination I3: Philippe Patrick Starck, Da Vinci I4: Renowned industrial celebrities, professional senior teachers, new friends I5: Steve Jobs, Wang, Weoi-Jong, Da-Wei Sun, Xu, Yi-Ming, (Jie-Min Wu, DreamWorks, Disney, and other animation makers I6: Pop stars, animation cartoon characters I7: Positive figures (e.g., Mayday, Chu Chen, Yen, Chang-Shou, Bill Gates), negative figures (e.g., Zheng Jie, drug-addicted artists, drunk driving incidents	Arts domain Non-arts domain Virtual characters Negative figures
Stimulation of imagination activities	I1: Chats with people who have different life experiences, engaging in hands-on activities such as gardening, block building I2: Developing courage of making new attempts by traveling or appreciating artistic activities, biannual life-risking activities I3, I4: Brainstorm training activities, relaxed time, after a bath or shower I5, I6, I7: Role-playing, visiting activities, artistic activities, sharing of story inspiration, experiential activities, special projects and reports, competitive activities	Competition Adventure Performance Visit Recreation

Based on the data collected, Expert Choice 2000 was adopted for statistical analysis. With the paired comparison matrix derived from the study, a consistency test was carried out for the weights of the overall hierarchical indicators, and then the relative weight of each perspective and attribute was established. The consistency test aims to find out the Consistency Index (CI), so as to check if the paired comparison matrix derived from the respondents' answers was a consistent matrix. Apart from assessing the decision-makers' judgments, the consistency test may also be applied to the overall hierarchical structure.

As a consistency benchmark, Saaty (1980) suggested a C.R.$\leqq$0.1 acceptable error for both assessing the decision-makers' judgments and testing the hierarchical structure, so that consistency may be guaranteed.

The Expert Choice software used in this study expressed a C.R. with the overall inconsistency test, which reached the threshold of $\leqq$0.1 in all of the teaching methods (.00), teaching material plans (.00), spaces (.01), personages (.01), and activities (.01) questionnaires. This means the overall factor hierarchy structure is consistent, and the relative weights derived are acceptable, indicating a good reliability of this study.

Data Analysis and Discussion

1. Analysis of interview results

In this study, seven teachers with more than ten years' teaching experience in design-related disciplines in northern, central, and southern Taiwan were interviewed to seek their opinions on teaching strategies that stimulate students' imaginations. Their opinions are summarized below:

Table 4 Analysis of interview results

2. Analysis of the results of the AHP weighing questionnaire

After reorganization, stimulation of imagination teaching strategies are distinguished into 5 major categories and 21 teaching contents. These were modified according to the opinions obtained from the expert questionnaire survey, and paired comparisons of various levels of indicators were conducted based on the semantic scale in order to derive the relative weights among the different levels of indicators. The consistency test and weights of the different levels of indicators are described below:

(1) Teaching strategies

Among the stimulation of imagination teaching strategies, the "stimulation of imagination activities" (.330) had the greatest weight, followed in sequence by the "stimulation of imagination materials" (.206), "stimulation of imagination methods" (.179), "stimulation of imagination spaces" (.168), and "stimulation of imagination personages" (.116), as shown in Table 4 below.

Table 4 Weights and order of stimulation of imagination teaching strategies

Perspectives	Weight	Order
Teaching activities	.330	1
Teaching materials	.206	2
Teaching methods	.179	3
Size of spaces	.168	4
Personages	.116	5

Overall inconsistency = .01

(2) Teaching contents

Among the contents of various teaching strategies, in the stimulation of imagination methods, the "practice-oriented" approach (.256) had the greatest weight, followed in sequence by the inspiration-oriented approach (.200), game-oriented approach (.200), cooperation-oriented approach (.139), temperament-oriented approach (.121), and individual-oriented approach (.085).

In the stimulation of imagination materials, audio-visual amination (.596) had the greatest weight, followed in sequence by graphics and text (.207), and current news (.197).

In the stimulation of imagination spaces, nature (.407) had the greatest weight, followed in sequence by graphic outdoor (.2997), and indoor (.294).

In the stimulation of imagination personages, artistic domain (.459) had the greatest weight, followed in sequence by graphics and text (.233), virtual characters (.182), and negative figures (.126).

In the stimulation of imagination activities, competition (.285) had the greatest weight, followed in sequence by adventure (.226), performance (.223), visits (.137), and recreation (.130).

Table 5 Weights and order of stimulation of imagination teaching contents

Teaching strategies	Teaching contents	Weight	Order
	Practice-oriented	.256	1
	Inspiration-oriented	.200	2
	Game-oriented	.200	3
Teaching methods	Cooperation-oriented	.139	4
	Temperament-oriented	.121	5
	Individual-oriented	.085	6

Teaching materials	Audio-visual amination	.596	1
	Graphics and text	.207	2
	Current news	.197	3
Size of spaces	Nature	.407	1
	Outdoor	.299	2
	Indoor	.294	3
Personages	Artistic domain	.459	1
	Non-artistic domain	.233	2
	Virtual characters	.182	3
	Negative figures	.126	4
Teaching activities	Competition	.285	1
	Adventure	.226	2
	Performance	.223	3
	Visit	.137	4
	Recreation	.130	5

Overall inconsistency = .01

3. Series of hierarchical analysis

According to the above weighing of the different levels of factors, the calculation of the overall hierarchical weights was then conducted to prioritize the demand for various capability indicators. Among them, participating in "competition" had the greatest weight (11.5%) for stimulating students' imaginations. The other analysis results of the overall hierarchical weighing are listed below in Table 6.

Table 6 Series of hierarchical analysis of the stimulation of imagination teaching contents

Items	Overall weighing order	Order
Competition	0.115	1
Adventure	0.091	2
Performance	0.09	3
Audio-visual animation materials	0.072	4
Practice-oriented approach	0.062	5
Nature	0.059	6
Visits	0.055	7
Recreation	0.052	8
Inspiration-oriented approach	0.049	9
Game-oriented approach	0.049	10
Outdoor spaces	0.043	11

Indoor spaces	0.042	12
People from artistic domain	0.04	13
Cooperation-oriented approach	0.034	14
Temperament-oriented approach	0.029	15
Graphics and text materials	0.025	16
Current news materials	0.024	17
Individual-oriented approach	0.021	18
People from non-artistic domain	0.021	19
Virtual characters	0.016	20
Negative figures	0.011	21

Overall inconsistency = .01

Conclusion and Recommendations

1. Factors that stimulate students' imaginations
Factors that may stimulate students' imaginations in teaching include: encouraging participation in activities, using a brainstorming approach, planning suitable teaching materials, visiting different venues, observing different people, etc.

2. Teaching strategies that stimulate students' imagination
Five teaching strategies that may stimulate students' imaginations are developed in this study; they are listed below in order of weight: teaching activities (0.330), teaching material plan (0.206), teaching methods (0.179), spaces (0.168), and personages (0.116).

3. Teaching contents that stimulate students' imagination
21 teaching contents that may stimulate students' imaginations are developed in this study; they are listed below in order of weight:
(1) Teaching activities: competition (0.285), adventure (0.226), performance (0.223), outdoor visits (0.137), recreation (0.13)
(2) Teaching material plans: audio-visual animation (0.596), graphics and text (0.207), current news (0.197)
(3) Teaching methods: practice-oriented (0.256), inspiration-oriented (0.2), game-oriented (0.2), cooperation-oriented (0.139), temperament-oriented (0.121), individual-oriented (0.085)
(4) Teaching spaces: nature (0.407), outdoor (0.299), indoor (0.294)
(5) Teaching personages: artistic domain (0.459), non-artistic domain (0.233), virtual characters (0.182), negative figures (0.126)

Acknowledgements

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