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การพัฒนาแบบวัดการรู้ทางทัศนะในนิสิตนักศึกษาระดับปริญญาบัณฑิต

The Development of a Visual Literacy Ability Test for Undergraduate Students

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บทคัดย่อ

การวิจัยในครั้งนี้มีวัตถุประสงค์เพื่อ 1) ศึกษาองค์ประกอบของแบบวัดการรู้ทางทัศนะ 2) พัฒนาแบบวัดการรู้ทางทัศนะ และ 3) เพื่อสร้างเกณฑ์ปกติของแบบวัดการรู้ทางทัศนะ กลุ่มตัวอย่าง คือ นิสิตระดับปริญญาตรี จำนวน 960 คน โดยใช้วิธีเลือกแบบหลายชั้นแบบมีชั้นภูมิ เครื่องมือที่ใช้ในการวิจัย ได้แก่ แบบวัดการรู้ทางทัศนะ

ผลการวิจัยพบว่า 1) องค์ประกอบของแบบวัดการรู้ทางทัศนะฯ ได้แก่ 1) การระบุขอบเขตของสื่อทัศนะที่ต้องการ 2) การค้นหาและเข้าถึงภาพ 3) การตีความและวิเคราะห์ความหมายของภาพ 4) การประเมินภาพและแหล่งสารสนเทศ 5) การใช้ภาพ 6) การออกแบบและสร้างสรรค์ภาพ และ 7) ความเข้าใจในจริยธรรมในการใช้ภาพ 2) แบบวัดการรู้ทางทัศนะฯ ประกอบด้วยแบบวัดแบบหลายตัวเลือก จำนวน 35 ข้อ และแบบเติมคำ จำนวน 2 ข้อ โดยมีค่า IOC ระหว่าง 0.70-1.00 3) คะแนนปกติวิสัยของแบบวัดฯ อยู่ในช่วงคะแนนทีปกติ ตั้งแต่ 36.58 ถึง 71.67

คำสำคัญ: แบบวัด, การรู้ทางทัศนะ, ทักษะในศตวรรษที่ 21

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Abstract

The objectives of research were 1) to study the components of the Visual Literacy Ability test (VLA); 2) to develop the VLA for undergraduate students; and 3) to construct a norm for the VLA. The research sample, selected using a stratified multi-stage cluster sampling, was 960 undergraduate students in total.

The research tool was the Visual Literacy Ability test. The research results showed that: 1) There are seven VLA components, as follows; i) Determine the extent of the visual materials needed ii) Find and access needed images iii) Interpret and analyze the meanings of images iv) Evaluate images and their sources v) Use images vi) Design and create meaningful images, and vii) Understand many of the ethical issues surrounding the creation and use of images, as well as access and use visual materials ethically. 2) The VLA test comprises a multiple-choice objective test, 35 items in total, and 2 items of gap-filling objective test. The IOC value of the VLA test ranged between 0.7-1.00 3) The norm of the VLA of undergraduate students in Thailand was found to be in normal-t value, from 36.58 to 71.67.

Keywords: test, visual literacy, 21st century skills

Introduction

The continuous development of information technology and innovation has made the access to numerous information more convenient for the public, making the current society become “Information Community” in which various and multiple information extensively spreads on the network; among them are high-quality information. Living effectively in the information community requires learners to adjust themselves to be a digital learner who is competent for life-time learning. Learning contexts in each period are different (Johansson, 2012; Kongmalai & Areesophonpichet, 2015; Pewporchai, 2011; Phuttasorn, 2014). The present learners are growing up in a digital learning contexts with fulls of multimedia. They are capable of multitasking and need fresh learning experience and innovative technology for learning; They are familiar with visual media, content with multimedia presentation especially the use of graphic, and likely to be developed into visual learner (Bleed, 2005; Brumberger, 2011;

Dallimore et al., 2010; Roehling & Brown, 2011).

Generally, information are in a form of texts and alphabets which are time-consuming to read and contrast to present learners' life style who prefer concise, easy to remember message, and coverage of main idea. Therefore, visual media is remarkably increasing its important role in digital communication. In addition, more and more visual media has been used in learning curriculum through highly popular descriptive illustrations. The development of visual media has evolved from traditional picture to graphic illustration in the present since visual learning is effective and possitively affects learning experience. (Beldarrain, 2006; Mayer, 2009; Price, 2009). Visual media, therefore, is essential for education. Moreover, many studies cite that the present learners still lack skill to comprehend visual media and the production of high-quality visual media through reliable procedure is not yet developed (Considine et al., 2009; Lundy & Stephens, 2015). Therefore, scholars and educators are increasing their interests in providing definition, researching factors and developing theoretical framework about visual media for better understand of this subject.

Visual literacy is a learner's competency to learn from visual media, including ability to identify areas of visual media of which learners require to search, access, define and analyze its core message; evaluate and utilise visual media effectively; independently design and create illustrations and visual media and recognise moral requirements when using illustrations and visual media. Learners with skillfull visual litercy are able to develop self-learning to be more effective, consequently improving learners' ability for sound life-time learning (Ausburn & Ausburn, 1978; Debes & Williams, 1969; Hattwig et al., 2011; Heinich et al., 1989; Wileman, 1993). Visual literacy is one of the most important fundamental skills for learners in the 21st century that encourages the potential of learning in higher education (Avgerinou, 2009; Hattwig et al., 2011; Lemke

et al., 2003; Lundy & Stephens, 2015). Brumberger (2011) and Oblinger et al. (2005) agree that, in higher education studies such as undergraduate study, learners should demonstrate proficient visual literacy. Therefore, visual literacy skill should be promoted to improve the quality of life-time learning of Thai people, according to The National Education Act 2010 (The National Education Act, 2010).

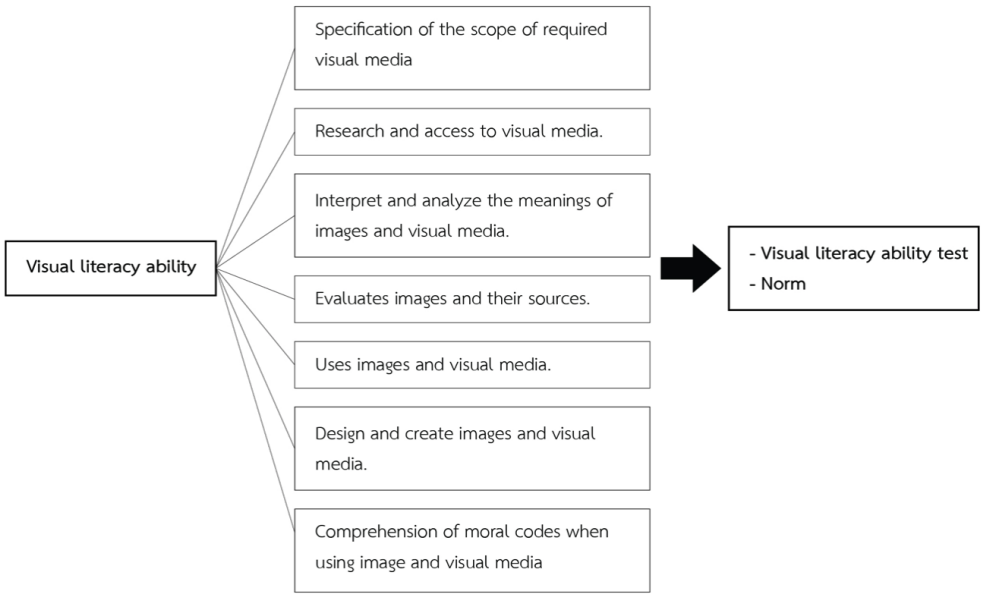
Research from various documents, journal, and studies shows that the subject of visual literacy for undergraduate students is not yet widely reseached in Thailand. Most of information are from overseas and the research of fundamental visual literacy framework is merely survey research, leaving supportive information for promoting visual literacy and evaluating learners' visual literacy insufficient, and in Thailand there is no visual literacy test to classify visual literacy leval's undergraduate student. From this statement of problem, this research aims to develop a visual literacy ability test as a model for general studies and the development of qualitative and accurate assessment which is able to precisely assess undergraduate students' visual literacy.

Objectives

1. To study the elements of the visual literacy ability test.
2. To develop of the visual literacy ability test for undergraduate students.
3. To specify norms of the visual literacy ability test for undergraduate students.

Figure 1

Research framework



Methodology

Population and Sampling

Population in this study are undergraduate students in state universities, state supervised universities, Rajamangala Universities of Technology and Rajabhat Universities.

Sample groups are undergraduate students in state universities, state supervised universities, Rajamangala Universities of Technology and Rajabhat Universities; comprising of 960 students, is for specifing norms of the visual literacy ability test for undergraduate students. The calculation for the size of samples group is done through G*power program, at .05 confidence level, then randomly pick samples by stratified multi-stage cluster sampling method. The procedure and selection in each stage is as follows.

1) According to the Office of the Higher Education Commission, there are 9 regional networking groups of universities, comprising of 154 institutes.

The researcher divided areas for collecting information into 4 groups; which are 1) Northern area 2) North Eastern area 3) Central area and 4) Southern area.

2) In each area, the types of universities were grouped as regulated by the Higher Education Commission; then divided into 2 groups, which were 1) state and state supervised universities and 2) Rajamangala Universities of Technology and Rajabhat Universities.

3) Specifically selected samples of each regional groups, totaling of 12 institutes as presented in Table 1.

Table 1

Selected institutes for collecting information

Area	Group of University/ Institute	University/ Institute	Number of Students
1. Northern area	State University/ state supervised university	1. Chiang Mai University	80
		2. Mae Fah Luang University	80
	Rajamangala Universities of Technology/ Rajabhat Universities	3. Chiang Rai Rajabhat University	80
2. North Eastern area	State University/ state supervised university	4. Suranaree University of Technology	80
	Rajamangala Universities of Technology/ Rajabhat Universities	5. Rajamangala University of Technology Isan	80
		6. Buriram Rajabhat University	80
3. Central area	State University/ state supervised university	7. King Mongkut's University of Technology Thonburi	80
		8. King Mongkut's University of Technology Ladkrabang	80

Table 1 (Cont.)

Selected institutes for collecting information

Area	Group of University/ Institute	University/ Institute	Number of Students
	Rajamangala Universities of Technology/ Rajabhat Universities	9. Valaya Alongkorn Rajabhat University	80
4. Southern area	State University/ state supervised university	10. Walailak University	80
		11. Prince of Songkla University	80
	Rajamangala Universities of Technology/ Rajabhat Universities	12. Nakhon Si Thammarat Rajabhat University	80

4. Once sample institues were identified, the researcher provided random samples given 80 samples per institute. The total samples are 960 students.

Research Procedure

The stages of the development of the visual literacy ability test. The procedure and development of the tool are a following;

1) Identify the objectives for the test. The researcher aims to create the visual literacy ability test that composes of structure which is compatible with the learning objectives of visual litercy learning. The key objective is to be used as a tool to assess undergraduate students' visual literacy.

2) Study, analyze and synthesize related concept, theory and research about the development of the visual literacy ability test through document review.

3) Creating the draft version of VLA test. The details of the development of the test and marking are as following;

3.1) Identify indicators, using the components from documents reviews.

3.2) Clearly write down questions, answers and explainations for the answers and their rationales.

3.3) Iidentify the concept for marking in the scoring rubrics methods for short answer test. The marking is to be considered if matches with the potential answers.

3.4) Once the test is completed, it is handed to 3 experts for reviewing its accuracy in terms of content, language, and subjectivity. The test is evaluated through Index of Item-Objective Congruence: IOC. The researcher, therefore, adjust the questions by changing the choices and the illustrations in the choices to be more subjective.

3.5) Conduct try-out test by asking randomly selected 60 students from King Monkut's Institute of Technology Ladkrabang who share similar characteristics with the samples to do the test in order to analyze the quality of each item and the whole test.

3.6) Analyze the results to identify discrimination; item discrimination and difficulty index for mutiple choice questions were measured by using upper-lower Index (U-L index) and essay questions were measured by using Whitney and Sabers' method. The reliabilty were analyzed by using Kuder-Richardson's KR-20. The researcher, therefore, adjust the questions by changing the choices and the illustrations in the choices to be more subjective.

4) Implement the VLA test with 960 undergraduate students, of which are divided into 240 students from Northern area, 240 students from North Eastern area, 240 students from Central area and 240 students from Southern area to collect the data.

5) Analyze the data by using software for statistics to developing testing norms.

Research tools

The research tool is the VLA test consists of 2 parts of assessments as follows: 1) four choices objective test, totaling 35 items; the correct answer is given 1 mark; the wrong answer is given 0 mark. 2) 2 items of short answer test, using 1-4 mark according to scoring rubrics.

Results

The results of this study can be concluded as follows:

1. The structure of the test were formulating by analyzed and synthesized documents as shown in Table 2.

Table 2

The indicators of the visual literacy ability test

Visual literacy Abilities	items
Component One: Specification of the scope of required visual media	
1. Defines the purpose of the image.	1
2. Defines the scope of the planned image use.	2
3. Explores image sources and generate ideas for relevant image content.	1
4. Identifies different image and visual media types and materials.	2
Component Two: Research and access to visual media.	
1. Selects the most appropriate image sources.	1
2. Identifies keywords, and related terms for the image needed.	2
3. Using appropriate technique to search image needed.	2
Component Three: Interprets and analyzes the meanings of images and visual media	
1. Identifies the subject and details of an image.	2
2. Describes the meaning of an image.	2
3. Describes the intended audience for an image.	1
4. Describes graphic, and elements of design of an image.	3

Table 2 (Cont.)

The indicators of the visual literacy ability test

Visual literacy Abilities	items
Component Four: Evaluates images and images sources	
1. Evaluates the aesthetic and design characteristics of images.	1
2. Evaluates the technical characteristics of images.	1
3. Assesses reliability of image sources.	2
Component Five: Using of image and visual media	
1. Selects appropriate images and visual media aligned with purpose.	1
2. Uses technology effectively to work with images.	1
3. Uses visual thinking skills to clarify and solve problems.	1
4. Presents images effectively.	1
Component Six: Designs and creates images and visual media	
1. Creates images and visual media to represent and communicate concepts.	2
2. Constructs appropriate graphic representations of data and information.	1
3. Uses design strategies and creativity to enhance effective communication.	2
4. Uses aesthetic design to create images and visual media.	2
Component Seven: Comprehension of moral codes when using image and visual media	
1. Identifies issues of privacy, ethics, and safety involved with creating, using, and sharing images	2
2. Cites visual materials using an appropriate documentation style	1

Note. Data for the indicators of the visual literacy ability test from Avgerinou, 2009, Debes, 1969, Hattwig et al., 2011, and Kovalik & King, 1998

2. The VLA test consisted of 7 components which were 1) specification of the scope of required visual media 2) research and access to visual media 3) intepretation and analyze of visual media message 4) evaluation of image

and resource of visual media 5) Using of image and visual media 6) design and create of image and visual media and 7) comprehension of moral codes when using image and visual media.

3. The scoring rubrics for short answer test after considered potential answers were formulate as shown on Table 3.

Table 3

Rubric scores of the short answer test

Question	Rubric scores			
	4 Excellent	3 Proficient	2 Average	1 Poor
1. Identify subject of image.	Definition is accurate and clear.	Some details and definition are generally correct.	Limited or weak definition.	Question has not been attempted or answered completely.
2. Identify keywords of image.	All keywords support definition or concept.	1-2 keywords show under-standing of concept.	1 keyword shows understanding of concept.	No keywords; only slightly related to topic.

4. The IOC results from the expert shown that the IOC rate is 0.70-1.00 which matches the criterion, and only 5 questions failed the criterion. The researcher adjusted the questions to be more subjective from the experts' recommendations.

5. The difficulty index (p) and discrimination (r) results from the 60 students meet the required standard; for greater extent, difficulty index is 0.35-0.72; the discrimination rate is 0.28-0.64. The reliabilty rate is analyzed by using Kuder-Richardson's KR-20. It is found that the rate for subjective test is 0.8248 and the rate for objective test is 0.7257.

6. The testing norms were analyzed from 960 students. The results score ranges from 13 to 33 and mean value is 23.12. The results are converted into

T-score of which the percentile is from 0.1-0.996; and the normalized T-score is from 36.58 to 71.67. The overall result from the sample students shows that the average score is below the half of the full marks for the test. This result shows that the samples have understandard visual literacy as displayed in Table 4.

Table 4

Percentile and normalized T-score of the visual literacy ability test

Percentiles	Raw-Score	Normalized T-Score
10	17	36.58
20	19	40.96
30	20	43.16
40	22	47.54
50	23	49.74
60	25	54.12
70	26	56.32
80	28	60.70
90	30	67.05
100	33	71.67

Discussion

The IOC rate of the visual literacy ability test reviewed by the experts is reliable, which is able to measure values according to the expected qualifications indentified in the difficulty index and the discrimination analysis of the test. In terms of the test's reliability analysis using Kuder-Richardson's KR-20, the test's content is compatible with the required standard for measure. According to the quality review by the expert, the strength of the test is that the test was uploaded online, therefore the samples did the test through computer system and were able to clearly see the illustrations. This also make the test more interesting; motivating the samples to answer more correctly, reducing

fatique from reading numerous texts; and more modern (Schultheiss et al., 2009). Moreover, the analysis of the average of all aspects of the test shows that the average score from the samples' results is below the half of the full marks. This can be explained that the samples have low visual literacy. The reason for the low marks could be that the focus of learning curriculum is not on developing students to practice skill in searching illustrations and media, interpreting, analyzing and creating visual media earnestly. This issue also causes the lack of supportive information for developing learning that promotes visual literacy since there are a few research about the process of visual media design (Bootkaew, 2013) and the development of learning tools about visual literacy (Endoo, 2011; Thanomsak, 2010; Thitiraskrit, 2009). Moreover, the research that experiments and presents knowledge about visual literacy in classroom is not yet conducted (Assenmacher, 2013).

Recommendations

1. The further research should be focused on the students in private university or another context to expand the finding results of the VLA test.

2. The development of visual literacy in classroom should be more conduct, according to the research finding that the students in this study has low level of visual literacy skills.

3. The result of this study can be used as a reference for the research that aims to develop the computer based VLA test.

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