

Academic Results Based on Ubiquitous Learning to Promote Learning Achievement and Media Literacy for Deaf students in Thailand

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This research aims to compare learning achievement and media literacy between a normal teaching approach and the ubiquitous learning approach (IPAA Model) among deaf students. Data was collected from 28 students based on the cluster random sampling. The experimental and control groups comprised 14 of each. The research tools include 1) An IPAA Model based teaching and learning plan to promote learning achievement and media literacy, 2) on-line teaching and learning materials, 3) a learning achievement assessment form, and 4) a media literacy assessment form. The data was analysed by statistics consisting of mean (\bar{x}), standard deviation (SD.) and One-way MANOVA. The results showed that students undergoing the IPAA Model teaching had higher learning achievement and media literacy than those undergoing normal teaching at a significance level of 0.01.

Key words: *IPAA Model, Ubiquitous Learning, Achievement, Media Literacy, Deaf Student*

Introduction

In Thailand, learning and teaching for deaf students is available at 16 secondary schools, each of which aims to enhance students' competence to learn and help themselves, as well as supply them knowledge for their future careers. This corresponds with the development of the disabled emphasised by the Thai government, particularly upgrading equal education. Also, according to Article 49 of the Thai Constitution of B.E. 2540, individuals have equal rights to access thorough and quality education. Thus, the poor, the disabled and the disadvantaged must have rights and support from the government for equal education. The disabled, in particular, are allowed basic education (Office of the National Education Commission, 2010) as the Act aims mainly to protect rights to education of the disabled. This corresponds to the Thai Constitution on educational



management, which differs from the one for ordinary people as the disabled can have access and opportunities to educational services and assistance since they were born or since the disability was found (The Ministry of Education, 2012). Therefore, the government is concerned with the education provided to the disabled, which must be maintained at its utmost capacity. In other words, the higher the education the disabled receive, the more socially accepted they will become.

The most important thing in the learning of deaf students concerns accommodation and the usefulness provided to them at their best. Development of learning approaches and materials should therefore think about simple use and easy access for the students. Ubiquitous learning is an alternative for learning management among deaf students because it integrates technology and real-life environments to enable learners to access to their study better. Consequently, it encourages learners to study at all times by using various tools to access learning content, interact with classmates, teachers and lessons, as well as appropriate inside and outside classroom environments (Mark Weiser, 1993; Bomsdorf, B. 2005; Mahachart Intachote & Sarot Sopheerak, 2015; Ley, D. 2007).

Various learning and teaching materials and numerous learning sources, alongside the knowledge provided in classrooms, promotes media literacy, which is crucial for students in analysing and selecting the appropriate media to use (Pornthip Yenjabok, 2011; Pakorn Prajanban & Anucha Konphuang, 2015; Chintana Tansuwannanon, 2007). Media literacy allows consumers to obtain, understand, analyse, produce or create other media on their own, while properly evaluating and using them for individual and social benefits (Livingstone and Sonia, 2009; Thoman, E and Joll, T, 2004; Potter, W.J, 2004).

The researcher already explored and studied previous research and found that teachers and students at secondary audio-visual schools in Thailand still had problems using teaching and learning materials. That is, they lack both the hardware and software specially made for deaf students (Educational Technology Center, Office of the Non-Formal and Informal Education. Office of the Permanent Secretary, Ministry of Education, 2007). The computer courses for deaf students, in particular, are an additional subject enabling students to access and understand technology better. From the study, the researcher realised that there was limitation on learning as students could learn only from seeing, watching, reading messages and sign language (Maliwan Thamsang, 2007), which makes it difficult for teachers to enable the students to fully understand and requires a lot of time to prepare their teaching. As a result, teachers have to develop their teaching approaches to suit the students. Otherwise, there should be materials to facilitate the students' learning because the materials will serve as a medium to promote better understanding among students, and good learning materials result in good learning achievement (Sri-on.J, 2001).

The above-mentioned issue highlights learning achievement via IPAA Model ubiquitous learning, which is a learning approach that promotes learning achievement and media literacy for deaf

students so that they develop knowledge and have media awareness. Moreover, it enables teachers to improve teaching approaches, which are appropriate for specific students, especially deaf ones, to study and know more (Nantarat and Sirirat, 2019).

Research Objectives

To compare learning achievement and media literacy between normal teaching and IPAA Model teaching for deaf students.

Research Hypothesis

Deaf students undergoing the IPAA Model teaching will enjoy higher learning achievement and media literacy than those undergoing the normal teaching.

Literature Review

The ubiquitous learning for deaf students to promote learning achievement and media literacy (IPAA Model)

The said model already comprises synthesised concepts, principles and theories on ubiquitous learning and improved them to become an appropriate teaching and learning model for deaf students. It underwent quality control and assessment from specialists on educational technology, information technology and teaching and learning for deaf students. The IPAA Model was considered highly appropriate as it includes 4 elements: interactivity, permanency, accessibility and adaptability. According to the Figure 1 below (Nantarat & Sirirat, 2019), each of the 4 elements can be described as follows:

1. Interactivity refers to learning characteristics in relation to teachers, peers and course contents so that they share experiences together and can help each other to learn and carry out some activities;
2. Permanency means that students can understand lessons and memorise their contents to be able to adapt, such as solving problems in teaching and learning activities and using knowledge to face current daily situations;
3. Accessibility stands for learning that enables students to access and obtain lessons or information at any time. Students can use wireless technology to gain correct and updated information, facilitating their learning; and
4. Adaptability is an adjustment in learning. Learners are allowed to use different tools appropriate to specific learning and adapt them to existing situations. As a result, students gain true knowledge and use it to solve problems in their daily environment.



Figure 1: The ubiquitous learning for deaf students to promote learning achievement and media literacy (IPAA Model) (Nantarat and Sirirat, 2019)

Media Literacy

Media literacy refers to the ability to access media, understand media meaning, analyse and distinguish facts, advantages and disadvantages, evaluate different kinds of media, as well as to create media and participate creatively within it. The media literacy adapted to serve learners' learning and teaching processes includes 5 steps: 1. Access skill which consists of behavioural assessment in terms of perceptive abilities, information retrieval, information storage and media memorising and understanding, 2. Analysis skill means behavioural assessment and ability to speak, explain facts, review advantages, disadvantages and effects as well as talking about the main and implied objectives correctly, 3) Evaluative skill includes behavioural assessment regarding whether to believe or not, distinguish, interpret, translate and judge media's values and appropriateness, 4. Creative skill means behavioural assessment in designing selected information properly, producing already planned media and research to gain proper information, and 5. Participative skill is to evaluate participation in opinion sharing, interacting with others and allowing them to take part in the interaction (Jolls, T and Thoman, E , 2008; Livingstone and Sonia, 2009; Hobbs, 2007; Potter, 2018; Thoman, E and Joll, T, 2008).

Learning Achievement

Learning achievement refers to the results from learning and teaching which includes knowledge, understanding and abilities together. They can be shown as behaviour which is evaluable in terms of the following: spirituality, mentality and skills (Gronlund, N. E., 1998), which correspond to Bloom's learning theory.

Assessment of learners' learning achievement according to learning standards and indicators as well as learning management plans under learning indication and evaluation of Bloom's taxonomy is categorised into 3 aspects: spirituality, mentality and skills. Learning can be further divided into 6 levels: 1) knowledge, which belongs to the lowest level, 2) comprehension, 3) application, 4) analysis, 5) synthesis, which is the ability to compose one thing to another different one and emphasises a new structure, and 6) evaluation, which refers to ability to decide whether something is right or wrong according to reasons and clear criteria (Bloom, B. S. 1971).

Research Methodology

Population and Sample

The population used in this research includes 94 deaf students of higher secondary education from an audio-visual school who attended a computer course in the 1st semester of the academic year 2019.

The sample used in this research are deaf students of higher secondary education from an audio-visual school who attended a computer course in the 1st semester of the academic year 2019. They were obtained from cluster random sampling. Of all 28 students, there are 2 groups. The first one is the experimental group, which consists of 14 students, and the second is the controlled group, which is composed of 14 students.

Research Tools

The researcher has developed the research tools as described below:

1. A learning management plan for the computer course, which includes three learning units. The first unit features presentation with information technology; the second, the internet; the third, intellectual property. This plan lasted 6 weeks according to the IPAA Model on learning and teaching. It underwent an evaluation from 5 specialists who gave a high-quality value with the average of 4.52 (SD = 0.59);
2. Online learning and teaching media. The researcher has developed the media according to the IPAA Model's components, which highlights three learning contents. They will be presented in the infographic form with a video of sign language. Pre and post tests will be provided apart from additional activities in each learning unit. A game will be given to enable students to take part in classroom interaction, besides exercises during classroom learning. The online teaching material sought for effectiveness from formative evaluation and a summative evaluation was provided after learning. Such material underwent an evaluation by 5 specialists who gave a high-quality value with the average of 4.49 (SD=0.53);
3. A learning achievement test consists of 60 questions with 4 multiple choices. It underwent IOC evaluation from 5 specialists and was given the IOC between 0.60-1.00 and difficulty and

easiness were from 0.20 to 0.80 respectively, while the discrimination value was between 0.20 and 0.70. Afterwards, reliability was tested by finding an internal stability according to the Kuder-Richardson KR-20 formula, which resulted in a value of 0.92; and

4. A media literacy form consists of 20 multiple-choice questions with 4 choices, and covers 5 aspects: access skill, 2) analysis skill, 3) evaluative skill, 4) creative skill and 5) participation skill. The researcher developed it by the IOC value provided by 5 specialists. The IOC value ranges from 0.60-1.00. It was then tested for reliability by finding an internal stability according to the Kuder-Richardson KR-20 formula, which resulted in the value of 0.66.

Data Collection

The researcher conducted the data collection as described below:

1. Formulating a teaching and learning plan with teachers from an audio-visual school in Songkhla with additional explanations on how to use the IPAA Model for teaching and learning management;
2. During the learning and teaching process, the researcher started by using the learning achievement and media literacy tests for the experimental and controlled groups; and
3. In terms of teaching and learning management, it was carried out according to a teaching plan which has 3 learning units in total. Activities took 6 weeks and teachers were responsible for conducting learning and teaching activities by detailing the teaching plan so that students understand it and are able to follow. The learning and teaching plan is fully described below:

Table 1 The learning and teaching management according to the IPAA Model based teaching plan

IPAA Model	Learning and Teaching Activities	Assessment
Interactivity	Students participated in learning together with their peers and teachers via small group discussions, participation and collaborative learning. Such teaching approach promoted learning as students could understand lessons' contents.	In each learning unit, learners were evaluated in terms of: <ul style="list-style-type: none"> - A pre-test - A test during learning - A post-test.
Permanency	Students did a pre-test and a post-test. There was an on-line game test using the Kahoot and Plickers programs which provide simultaneous responses. Moreover, the learning and teaching activities allowed students to express opinions, answer questions and practice during learning so that they have permanent knowledge and	

IPAA Model	Learning and Teaching Activities	Assessment
	understanding.	
Accessibility	Students chose a learning unit via an on-line learning medium provided by learning and teaching videos. Each learning unit has sign language. Students can learn via their cell phones or other devices such as a tablet or a personal computer after they scanned a QR code.	
Adaptability	Students took part in learning under actual environment via a video in which sign language was provided to describe the lesson's content. They also had to create a work assigned by each learning unit from in-class exercises that enable them to complete the work by themselves.	

In assessing learning outcomes of learners, a learning assessment form, a media literacy form, and a test during classroom learning based on learning units was given.

1. When the 6-week learning and teaching plan of three learning units in total terminated, the researcher tested both the experimental and the controlled groups with the 60-choice learning achievement test and the 20-choice media literacy one. The former took 90 minutes and the latter took 45 minutes.
2. Scores of the two above-mentioned tests were collected for further statistical analyses according to the MANOVA.

Results

Following the above-mentioned study, the researcher would like to test the earlier said hypothesis: whether normal teaching and the IPAA Model-based teaching would make any difference for deaf students in terms of learning achievement and media literacy. The researcher did so by comparing the results between the controlled group of students undergoing the normal teaching and the experimental one undergoing the IPAA Model teaching. According to the use of the MANOVA statistics for data analysis, the researcher used the MANOVA's test of assumptions, from which the results are as follows:

Table 2 Results of MANOVA's test of assumptions

	Normal Distribution		Pearson Correlations	Box's M Test (Sig.)	Bartlett's Test (Sig.)	Levene's Test (Sig.)
	Experimental	Control				
Learning Achievement for the computer classroom	.063	.927	.585**	.936	.000	.316
Media Literacy	.578	.216				.821
Results	Normality	Normality	.585 < α	Sig > α	Sig < α	Sig > α

Sig = .00 α = .05

According to Table 2, the data distribution test with statistics showed that, in terms of Shapiro-Wilk, the data distribution was normal for all the four groups at the significant implication of .05. The test on equality of variation of many variables according to the Box's M test statistics did not find any significant implication (Sig > α). When the correlation values of dependent variables, namely the learning achievement and media literacy, were verified, the correlation's level was at .585, which did not exceed .80. This showed that the initial test corresponded to the specification and the MANOVA was allowed to be used here.

Table 3 Presentation of comparison between the average and standard deviation of the learning achievement for computer classroom and media literacy after studying

Dependent Variable	Independent Variable	N	\bar{x}	SD	F	Sig.
Learning Achievement for the computer classroom	experimental	14	44.79	5.78	11.67	.002
	control	14	37.93	4.79		
Media Literacy	experimental	14	14.93	1.77	11.47	.002
	control	14	12.71	1.68		

α = .01

Table 3 showed that scores of the learning achievement for computer classroom and the media literacy among students of the experimental group were higher than those of the controlled group at the significant implication level of .01. Given the consideration of each aspect from the above table, the experimental group had average scores on the learning achievement for computer classroom of 44.79 (SD. = 5.78). The number is higher than the controlled group's, which had average scores of 37.93 (SD. = 4.79). Also, the experimental group's scores on media literacy were 14.93 (SD. = 1.77), which were higher than the controlled group's scores of 12.71 (SD. = 1.68). From the results, it can be concluded that deaf students of the experimental group who

underwent the IPAA Model teaching for the computer classroom enjoyed higher scores of the learning achievement and the media literacy than those undergoing the normal teaching.

Discussions

The above results of this research showed that the learning achievement and media literacy of deaf students according to the normal teaching and the IPAA Model differed. Students undergoing the IPAA Model teaching had higher learning achievement and media literacy than those undergoing normal teaching at the level of significant implication of .01. As a result, deaf students who attend the IPAA Model teaching had better learning achievement and media literacy than the ones attending the normal teaching. This corresponds to the study and theory indicating that deaf people can learn and memorise well by seeing (Maliwan Thamsaeng, 2007). Appropriate learning media which can present both still and moving images as well as letters and sign language videos provided for each learning unit will promote better learning among students. The IPAA Model-based learning synthesised the ubiquitous learning concept and theory in studying how deaf students learn to enhance learning achievement and media literacy to suit the specific group of learners.

Teaching and learning management under the IPAA Model includes 4 crucial ubiquitous learning components. Each of them features learning and teaching activities and assessment before, during and after classrooms in every learning unit. Contents of learning units will consist of knowledge on media literacy to promote understanding of this topic for learners. The learning and teaching management has the following details:

1) Interactivity: In teaching and learning, students can interact with their peers, teachers, learning contents, and Google sites, through in-class learning, teaching activities, and small group discussions, which calls for participation and collaboration. This corresponds to the research of Supachai Srinuan (2015) and Mana Prateppornsak (2005) who found that learning and teaching management for deaf students should emphasise creating a proper learning environment, analysing learners and encouraging them to learn and practice with the appropriate media to promote good learning.

2) Permanency: Learning and teaching usually provides revision of the past knowledge by enabling students to take a pre-test. During the classroom, activities, such as games, will allow students to take part in answering questions to test their knowledge by using the Kahoot and Plickers programs, which provided immediate results. Students could therefore evaluate their knowledge and teachers could check individual students' learning results, as well. Besides, students could practice during the classroom learning according to learning units via videos with sign language. After the class, students had to take a post-test to create permanent understanding and knowledge. This corresponds to the concept of Kasemsri (2001) and Ruksiri (2011) who

claimed that learning permanency would allow learners to use their knowledge to solve daily problems; that is, learners will memorise knowledge they already obtained for a while and use it for their own benefits.

3) Accessibility: Students can learn anytime and anywhere via on-line media. Besides, they can review the contents they already passed. Students can learn from cell phones or other devices like tablets, notebooks or PCs and can access information via QR code scanning without difficulty.

4) Adaptability: Teachers can create learning conditions according to the learning capacities of deaf students by considering the appropriate perception and learning approaches of the students. They can make a video with sign language for theoretical and practical lessons so that students learn and practice on their own. This corresponds to the research of Supachai Srinuan, (2015) who claimed that media designed for deaf students should take into account media use, facilities, services and other kinds of assistance appropriate for learning.

Conclusion

Introducing the IPAA Model-based ubiquitous learning to teach deaf students is a way to promote learners to have better learning achievement and media literacy as the learning approaches are appropriate to learners with various learning media and activities that make interesting lessons to attract learners. Alongside the knowledge from the lessons that learners can obtain, understanding about media literacy is created to enable learners to realise principles on data access and their ability to use and consider correct and appropriate media. This results in learners' self-development to follow that of normal people. Such is in accordance with the Thai government's policy to promote individuals' equality, especially special groups of people. When deaf students understand and are able to learn well, how they live their life will improve and they can work on their own to take care of themselves.

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