

A Needs Assessment of Learning Management Supervision Using a Web Application in Basic Schools in Thailand

Thanakorn Napaphorn^a, ^aSchool of Graduate Studies, King Mongkut's Institute of Technology, Bangkok, Thailand,

This study aimed to 1) reveal administrators' and teachers' authentic situations and expectations towards learning management supervision; and 2) evaluate their needs towards learning management supervision. Samples were participants from 120 basic schools of different sizes in the Northeast Region of Thailand. The needs of learning management supervision using the web application questionnaire were used to collect the data. For data analysis, frequency distribution, percentage, mean, standard deviation, and priority need index modified (PNI modified) were utilised. It was found that: 1) administrators' and teachers' perceptions towards authentic situations of learning management supervision in all school sizes were at a 'moderate' level ($M=2.67$, $S.D.=0.17$); 2) The expectations towards authentic situations of learning management supervision in all school sizes were at a 'high' level ($M=3.67$, $S.D.=0.27$); 3) The highest priority was 'learning management supervision using the web application.' To conclude, supervision using a web application could improve instruction and classroom quality.

Key words: *Learning management, supervision using a web application, needs assessment, educational management.*

Introduction

As a result of smartphones, rapid changes in Thai society during the globalisation era have caused fast and effective communications and exchanges of knowledge. Smartphones and the internet have become the fifth need for humans to live. They have maximised communication and destroyed barriers and boundaries of human interactions. The world seems to become flat. Distances and time look vague. Also, they have pushed Thai society towards a so-call 'digital society', and the 'internet of things' plays a vital role in people's daily lives. Interestingly, a

survey in 2018 conducted by the National Statistical Office of Thailand found that the population from six years old who accessed smartphone applications amounted to 56.66 million people (80.6% of the Thai population) (National Statistical Office of Thailand, 2018:1). This indicates that the influence of smartphone applications have greatly affected people's behaviours. Likewise, the applications have been widely used in government offices. Around 17.90 million people (13.59% of the Thai population) have accessed their official online offices through applications on smartphones.

The Ministry of Education (MOE) is concerned with the importance of trends and changes. To develop national education quality, it has given policies and strategies through MOE Educational Plan 12th Issue: 2017-2021 to drive Thai education to the goals. The 3rd Strategy involves the promotion of research and digital literacy for improving ongoing teacher professional development; and the 5th Strategy involves the promotion and development of digital technology for providing lifelong learning to Thai citizens through information and technology. Therefore, based on teacher professional standards, teachers need to know how to use technology in their careers. This relates to the 2nd Strategy for teachers and educators to develop their digital literacy and teaching potentials, as well as the 1st Strategy in the twelfth National Economic and Social Development Plan: 2017-2021: promotion and development of human capital for the 21st-century. Hence, administrators as learning management facilitators need to place the priority on enhancing teachers' academic aspects. Inservice teachers need administrative support, which is the very responsibility of school management (He, 2022). Besides, at any level or type of educational management, academic works or performances reflect the quality of a school as they reflect the curriculum and learning management. In other words, academic management is the heart of school management (Thammasaeng, Papat, and Phetchaboon, 2016). Most importantly, 'mobile phones have changed the way that we communicate and the way that people expect to be contacted' (Partridge, 2007).

As a result, a needs assessment of learning management supervision using a web application in basic schools was carried out to seek gaps and desired outcomes in order to develop a supervision model for learning management by using web applications, which will be useful for education teachers and administrators.

Objectives

1. To reveal administrators' and teachers' expectations and authentic situations towards learning management supervision using a web application in basic schools;
2. To evaluate their needs towards the learning management supervision using the web application.

Literature review

Need Assessment

The term *needs assessment* refers to ‘any process through which the learning needs of a group are analysed. This information is generally ascertained through observation, interviews, surveys, and/or documentation reviews. Conducted prior to the development of an instructional program, a needs assessment allows the program to be designed based on identified needs (Collins & O’Brien, 2012). Also, needs assessment is a method used to investigate deficiencies, determine need, or gages gaps and insufficiencies (Royse, Station-Tindall, Badger & Webster, 2009). Royse *et al.* (2009) further stated that needs assessment comes from particular action or activity. Many people, communities or large groups, are involved and the results from the assessment provide estimates or sophisticated assumptions regarding perceived needs. Besides, needs can be a desire for improving current performances or to fulfil deficiencies (Barbazette, 2006). Southwest Comprehensive Centre (2008, p.7) clarifies that there are two goals of need assessment, i.e., to verify existing capabilities and to estimate the existing gaps between the current situation and the desired situation. However, the assessment also provides direction for a program or particular activities; determines priorities and gives limited resources for a particular activity; and creates cohesion through the alignment of goals, strategies, professional development, and desired outcomes. Implementations and impacts can also be benchmarked and monitored; and help staff identifies any changes through continuous improvement activities.

Learning Management

The learning management concept was originally adapted from architectural design and developed by Richard Smith. It refers to a pedagogical design with the intent and implementation of pedagogical strategies aimed to boost learning outcome achievement (Smith & Lynch, 2010). The practitioner of learning management is regarded as a learning manager (Lynch, 2012).

Supervision

Regarding the term of supervision, Collins and O’Brien (2012) described that, in general, it is a guided process of someone who possesses a specified level of mastery to a less experienced person. It consists of 5 steps: problem identification, diagnosis, planning, implementation, and evaluation. In the education field, supervision involves schools and teachers. The main purpose is to improve instruction. Supervisors may have assistive or administrative roles when they do ‘supervise.’ The former refers to direct or indirect provision services, meanwhile, the latter refers to administrative or evaluative services. They further explained that ‘Assistive

supervisors may assist teachers by establishing communication, aiding and supporting them, and offering expertise in specific areas, providing both direct and indirect services. Administrative supervisors may manage and control instructional programs as well as evaluate teachers for personnel decisions.’

Richard and Schmidt (2010) also clarified that the term of supervision refers to the monitoring and evaluation of a teacher’s teaching performance. The supervisor’s main role can be as a teaching performance evaluator or an instruction consultant or facilitator. For the former, supervisors attempt to point out the actual teaching performances and ideal teaching behaviour. They also guide and offer suggestions for improvement. If the supervisors focus more heavily on instruction as a consultant or facilitator, aspects of teaching will be discussed, negotiated, and teachers will be encouraged to perform self-development through reflection and self-observation.

Web Application

Web applications refer to web-based applications or application programs. They do not need to be downloaded because they must be accessed through a network. Users need just a browser interface like Google Chrome, Mozilla Firefox or Safari (Rouse, 2019; Alsadoon, 2018). Web applications can be used for a wide variety of uses and by anyone (Rouse, 2019). Users not only can access websites, but also read and write, customise, add to the content, and interact with other users. Facebook, Flickr, Google Documents, wikis, WordPress, blogs, YouTube, Twitter, Podcast, Wikipedia, Skype, and Prezi are examples of web applications (Alsadoon, 2018). In line with this, Aljraiwi (2017) explained that web applications work on any web browser and are accessed using the Internet. They are developed using the Web Application Framework and created using various programming languages, e.g., Php, Java, Python, Perl, Ruby, etc. Web applications are multifunctional. They can be used for various purposes and comes with many potential benefits. For instance, multiple users can access the same web application at the same time, and users do not have to install the web application before accessing it. The application can be accessed through various platforms such as a desktop, laptop, or mobile, and it is compatible with multiple browsers (Rouse, 2019).

To conclude, web applications are different from websites for the reason that websites contain mere articles and photos. Websites are organised hierarchically. A home page serves as the initial access point at the top of the hierarchy. Additional web pages are the branches from the hierarchy and hyperlinks connect related web pages within the site (Collins and O’Brien, 2012). Meanwhile, the former allows users to interact with the sites or other users. They are developed by the web application framework, which is written in various programming languages. (Elshaby, 2013 as cited in Aljraiwi, 2017).

Previous Studies

Babcock, Lehan and Hussey (2019) conducted a needs assessment at an online institution to understand administrator, faculty, and student perceptions towards services and resources and reveal gaps between authentic situations and desired outcomes, i.e., personalised support, clarity of services, and shared accountability for student success. The results were found that student empowerment needed to be promoted. This can be achieved through personalised support to prevent struggling students from feeling overwhelmed, and direct them to specific services and resources based on their unique needs.

Sharkey, Hunnicutt, Mayworm, Schiedel and Calcagnotto (2014) conducted a needs assessment and developed a training program for yard supervisors at a public elementary school. The study also aimed at helping yard supervisors respond more effectively to student conflicts and promote a positive school atmosphere. Need assessment data was analysed and used to create appropriate training for the yard supervisors and maximise their effectiveness as school psychologists.

O'Reilly (2016) investigated the understanding of challenges that pre- and in-service language teachers within a US higher education setting face with technology due to technology's integration. This was to enable them to adapt it to their current practice. Therefore, a needs assessment based on eight indicators was carried out. The eight indicators included: self-assessed skill level, technology use and integration, teacher beliefs, barriers to access, professional development resources, leadership, needs and wants, and demographics. The results showed some deficiencies that need to be fulfilled. Besides, he concluded that the needs assessment was important. In other words, 'effectively adopting and integrating technology in a formal educational context begins with identifying program needs.'

Aljraiwi (2017) studied the effect of web applications on teaching, learning and academic performance among female students at the tertiary level in a college in Saudi Arabia. It was found that web applications promoted their motivation and performances. Teachers also were able to facilitate and support them in the process of learning either in the classroom or outside classroom settings.

Conceptual Framework

The present study follows the needs of learning management supervision using a web application in basic schools adapted from Oliva (2005), Kotter (2017), Kaplan, Nolan and Norton (2018), and Kitti-ratchadanon, Chanbanjong, Meejaeng, and Chansila (2009). As a research framework, it includes the following 8 components:

1. Information management: refers to data collections regarding learning management supervision.
2. Supervision planning: refers to planning or preparing the procedures of learning management supervision.
3. Learning management supervision activities: refer to selecting particular supervision activities based on the supervisees' needs and situation.
4. Learning management supervision evaluation: it refers to an evaluation after supervision that informs supervisees of the supervision results.
5. Learning management supervision techniques and approaches: refer to supervision techniques and approaches that were based on the supervisees' situation and needs
6. Learning management supervision participation: refers to the supervisors' and supervisees' participation in supervision activities.
7. Learning management supervision development research: refers to using research processes to develop the learning management supervision to improve and solve problems in the supervision processes.
8. Using a web application for learning management supervision: refers to finding and/or adopting an appropriate web application for supervising teachers' learning management.

Method

Population and Samples

The population comprised basic schools (primary schools) under Educational Service Area Offices in the Northeast Region, Thailand.

Samples included 120 basic schools (primary schools) under Educational Service Area Offices in the Northeast Region, Thailand using multiple random sampling techniques. The researcher purposefully chose schools under Nakhonratchasima, Chaiyaphum, Buriram, and Surin Educational Service Area Offices, located in the south of the Northeast Region, Thailand because this area was the researcher's hometown and it was not difficult to collect the data. To select schools from each Education Service Area Office, the simple random sampling technique was used to get 10 districts from each province (altogether 40 districts). Finally, the researcher utilised the stratified random sampling technique to select 3 basic schools, i.e., big-size school, medium-size school, and small-size school, from each district. There were 120 schools in total. As a result, the participants included 120 school directors and 240 teachers (two teachers per school) for 360 participants in total.

Variables

Variable Study: the needs of learning management using the web application in basic schools

Research Tools

A 5-point Likert scale survey questionnaire was employed to collect the data. The frequencies were as follows:

- 5 means very high (81-100% of the time)
- 4 means high (61-80% of the time)
- 3 means moderate (41-60% of the time)
- 2 means low (21-40% of the time)
- 1 means very low (0-20% of the time)

It consisted of 8 components and 73 items in total. Within the 73 questions, they asked the respondents to rate their perceptions towards their supervision expectations and the authentic situations in their institutions.

Regarding content validity, the questions were approved by 5 experts. It was also tried out with a group of administrators and teachers who had the same characteristics as the subjects. The results revealed that the reliability of the perceptions towards supervision expectations was 0.95, while the authentic situations in the institution were 0.97.

Data Collection

The data was collected in 2020. The questionnaires were employed to gain quantitative data. The online version was sent out to the participants. They rated their perceptions towards learning management supervision and the authentic situations in their schools. The data was computed, analysed, and interpreted.

Data Analysis

- 1) The data of the level of perceptions towards learning management supervision using a web application in basic schools was analysed with basic statistics: i.e. mean (M) and standard deviation (S.D.).
- 2) The data of the priority of needs assessment was analysed with Priority Index Modified (PNI modified) (Wongwanit, 2015)

$$PNI_{\text{modified}} = \frac{I-D}{D}$$

I = Mean of the expected situation

D = Mean of the authentic situation

Results and Discussion

Results

A. *Table 1* shows the general information of participants. The questionnaires were answered by 360 administrators and teachers from 60 small schools (50%), 48 medium schools (40%), and 12 big schools (10%).

Table 1: Frequency and the average percentage of participants divided into three school sizes

School Sizes	Number	Percentage (%)
Small	60	50
Medium	48	40
Big	12	10
Total	120	100

B. *Table 2* shows the authentic situations of learning management supervision using a web application in basic schools. It was found that, on average, it was at a 'moderate' level ($M=2.76$, $S.D.=0.17$). When considering each school size, it was found that medium-sized schools had the highest mean ($M=2.80$, $S.D.=0.13$), followed by the big-sized schools ($M=2.79$, $S.D.=0.90$) and the small-sized schools ($M=2.69$, $S.D.=0.20$), respectively.

Table 2: Mean (M) and standard deviation (S.D.) of the authentic situations of learning management supervision using a web application in basic schools (n=120)

Components	School sizes	M	S.D.	Level
Information management	Small	2.63	0.31	<i>Moderate</i>
	Middle	2.84	0.28	<i>Moderate</i>
	Large	2.83	0.24	<i>Moderate</i>
	Total	2.75	0.30	<i>Moderate</i>
Supervision planning	Small	2.82	0.18	<i>Moderate</i>
	Middle	2.98	0.10	<i>Moderate</i>
	Large	2.84	0.20	<i>Moderate</i>
	Total	2.89	0.17	<i>Moderate</i>
Learning management supervision activities	Small	2.55	0.52	<i>Moderate</i>
	Middle	2.94	0.21	<i>Moderate</i>
	Large	2.84	0.30	<i>Moderate</i>
	Total	2.77	0.42	<i>Moderate</i>
Learning management supervision evaluation	Small	2.92	0.11	<i>Moderate</i>
	Middle	2.82	0.28	<i>Moderate</i>
	Large	2.85	0.22	<i>Moderate</i>
	Total	2.86	0.22	<i>Moderate</i>
Learning management supervision techniques and approaches	Small	2.89	0.13	<i>Moderate</i>
	Middle	2.86	0.19	<i>Moderate</i>
	Large	2.92	0.13	<i>Moderate</i>
	Total	2.88	0.16	<i>Moderate</i>
Learning management supervision participation	Small	2.64	0.40	<i>Moderate</i>
	Middle	2.70	0.36	<i>Moderate</i>
	Large	2.68	0.41	<i>Moderate</i>
	Total	2.67	0.38	<i>Moderate</i>
Learning management supervision development research	Small	2.77	0.41	<i>Moderate</i>
	Middle	2.90	0.19	<i>Moderate</i>
	Large	2.94	0.13	<i>Moderate</i>
	Total	2.85	0.30	<i>Moderate</i>
Using a web application for learning management supervision	Small	2.32	0.47	<i>Moderate</i>
	Middle	2.39	0.51	<i>Moderate</i>
	Large	2.41	0.45	<i>Moderate</i>
	Total	2.36	0.48	<i>Moderate</i>
Total	<i>Small</i>	2.69	0.20	<i>Moderate</i>
	<i>Middle</i>	2.80	0.13	<i>Moderate</i>
	<i>Large</i>	2.79	0.09	<i>Moderate</i>
	<i>Total</i>	2.76	0.17	<i>Moderate</i>



C. As shown in *Table 3*, in contrast to the authentic situations, the expectations of learning management supervision using a web application in basic schools was at a 'high' level ($M=3.67$, $S.D.=0.27$). When considering school sizes, it was found that the big-sized schools showed the highest expectations ($M=3.94$, $S.D.=0.15$), followed by medium-sized schools ($M=3.87$, $S.D.=0.20$), and small-sized schools ($M=3.47$, $S.D.=0.15$), respectively.

Table 3: Mean (M) and standard deviation (S.D.) of the expectations of learning management supervision using a web application in basic schools (n=120)

Components	School Sizes	M	S.D.	Level
Information management	Small	4.79	0.28	<i>High</i>
	Middle	3.22	0.27	<i>Moderate</i>
	Large	4.66	0.62	<i>Very high</i>
	Total	4.15	0.82	<i>High</i>
Supervision planning	Small	3.56	0.23	<i>High</i>
	Middle	3.78	0.41	<i>High</i>
	Large	3.32	0.20	<i>Moderate</i>
	Total	3.62	0.34	<i>High</i>
Learning management supervision activities	Small	3.33	0.60	<i>Moderate</i>
	Middle	3.76	0.72	<i>High</i>
	Large	3.23	0.55	<i>Moderate</i>
	Total	3.49	0.68	<i>Moderate</i>
Learning management supervision evaluation	Small	3.19	0.44	<i>Moderate</i>
	Middle	3.50	0.48	<i>High</i>
	Large	4.71	0.44	<i>Very high</i>
	Total	3.47	0.63	<i>Moderate</i>
Learning management supervision techniques and approaches	Small	3.69	0.54	<i>High</i>
	Middle	3.91	0.69	<i>High</i>
	Large	4.31	0.40	<i>High</i>
	Total	3.84	0.62	<i>High</i>
Learning management supervision participation	Small	2.98	0.05	<i>Moderate</i>
	Middle	3.35	0.78	<i>Moderate</i>
	Large	2.83	0.13	<i>Moderate</i>
	Total	3.11	0.53	<i>Moderate</i>
Learning management supervision development research	Small	3.00	0.00	<i>Moderate</i>
	Middle	4.83	0.55	<i>Very high</i>
	Large	4.16	0.02	<i>High</i>
	Total	3.85	0.99	<i>high</i>
Using a web application for learning management supervision	Small	3.19	0.13	<i>Moderate</i>
	Middle	4.62	0.47	<i>Very high</i>
	Large	4.26	0.86	<i>Very high</i>
	Total	3.87	0.80	<i>High</i>
Total	<i>Small</i>	3.47	0.15	<i>High</i>
	<i>Middle</i>	3.87	0.20	<i>High</i>
	<i>Large</i>	3.94	0.15	<i>High</i>
	<i>Total</i>	3.67	0.27	<i>High</i>

D. Table 4 reveals the results of the priority of needs assessment of the learning management supervision using a web application in basic schools. It has been shown that the PNI_{modified} results ranged from 0.27 to 0.62. Rankings of the most need to least is as follows: 1) using a web application for learning management supervision ($PNI_{\text{modified}} = 0.62$); 2) learning management supervision techniques and approaches ($PNI_{\text{modified}} = 0.41$); 3) learning management supervision participation ($PNI_{\text{modified}} = 0.40$); 4) information management ($PNI_{\text{modified}} = 0.36$); 5) learning management supervision activities ($PNI_{\text{modified}} = 0.35$); 6) learning management supervision evaluation ($PNI_{\text{modified}} = 0.30$); 7) learning management supervision development research ($PNI_{\text{modified}} = 0.28$); and 8) supervision planning ($PNI_{\text{modified}} = 0.27$).

Table 4: Results of Priority Needs Index modified: PNI_{modified}

Components	AVG. of Authentic Situation (D)	AVG. of Expected Situation (I)	PNI_{modified}	Rank
1	2.85	3.89	0.36	4
2	2.87	3.67	0.27	8
3	2.85	3.86	0.35	5
4	2.83	3.71	0.30	6
5	2.86	4.06	0.41	2
6	2.85	3.67	0.28	7
7	2.88	4.04	0.40	3
8	2.43	3.96	0.62	1

Discussion

1. Regarding the authentic situations of learning management supervision using a web application in basic schools based on school sizes, it was found that, on average, it was at a 'moderate' level ($M=2.76$, $S.D.=0.17$). Among school sizes, the medium-sized schools were at the highest mean ($M=2.80$, $S.D.=0.13$), followed by the big-sized schools ($M=2.79$, $S.D.=0.90$) and the small-sized schools ($M=2.69$, $S.D.=0.20$), respectively. The results have shown that it could be because of a lack of systematic supervision in the schools. Also, technology had not been used to facilitate teachers in managing learning, which signalled that schools faced learning management related problems (Bishop, 2012).

2. The expectations of learning management supervision using a web application in basic schools were at a 'high' level ($M=3.67$, $S.D.=0.27$). When considering the school sizes, the big-sized schools were at highest expectations ($M=3.94$, $S.D.=0.15$), followed by medium-sized schools ($M=3.87$, $S.D.=0.20$), and small-sized schools ($M=3.47$, $S.D.=0.15$), respectively. This could mean that schools had a less effective supervision system. The use of technology had not been employed to support the instructions, and teachers did not emphasise child-centred

learning (Gruman and Purgason, 2019). Therefore, the results indicated that schools needed learning management supervision using a web application in basic schools to improve learners' performances and increase national education quality (ONESQA, 2018).

3. Concerning the priority of needs assessment of the learning management supervision using a web application in basic schools, it was found, from the most necessary to the least, that using a web application for learning management supervision was the priority, followed by learning management supervision techniques and approaches, learning management supervision participation, information management, learning management supervision activities, learning management supervision evaluation, learning management supervision development research, and supervision planning, respectively. The results showed that administrators and teachers need greater supervision using web applications in their schools to develop their supervision system, which would enable the schools to be outstanding in teaching and learning (California Emerging Technology Fund, 2008). This is in line with Kitti-Ratchadanon (2007) who found that teachers and administrators needed supervision to improve learning management. Also, adopting related ICT media in learning management supervision would maximise the effectiveness of learning management.

Conclusion

The results revealed that the perceptions towards the authentic situations of supervision in basic schools was at a 'moderate' level ($M=2.67$, $S.D.=0.17$), while the expectations were at a 'high' level ($M=3.67$, $S.D.=0.27$). As a result, administrators and teachers needed learning management supervision using a web application the most ($PNT_{\text{modified}} = 0.62$). The results indicated that a web application could facilitate administrators and teachers to cooperate in improving teaching quality.

Suggestions

1. For further studies, the factors of effectiveness of learning management supervision using web application studies should be examined. It is for this reason that issues regarding learning management supervision using a web application can be investigated. Also, in response to this, supervision using a web application can be improved and affect instruction and classroom quality.

2. It should be noted that learning management supervision using a web application should be promoted and improved to create a systematic supervision approach in basic schools.



Acknowledgment

This study was possible because of many helpful people. The author would like to thank the administrators and teachers for their support and cooperation. Also, my thankfulness extends to my academic supervisor who provided me useful suggestions, recommendations, and care. With her guide and direction, this work has become more beneficial and valuable academically.

Thanks to all the staff at the Industrial Education and Technology Curriculum for the academic friendliness. Thanks to the superior officers and colleagues who helped me concerning the data collection. And finally, the author would like to thank my family who always supported me spiritually.



REFERENCES

- Aljraiwi, S.S. (2017). The Effect of Classroom Web Applications on Teaching, Learning and Academic Performance among College of Education Female Students. *Journal of Education and Learning*, Vol. 6, No. 2; 2017. [Http://dx.doi.org/10.5539/jel.v6n2p132](http://dx.doi.org/10.5539/jel.v6n2p132)
- Alsadoon, E. (2018). Motivating Factors for Faculty to Use Web Applications in Education. *The Turkish Online Journal of Educational Technology: TOJET*, v17 n3 p73-90 Jul 2018
- Babcock, Ashley; Lehan, Tara; Hussey, Heather D. (2019). Mind the Gaps: An Online Learning Center's Needs Assessment. *Learning Assistance Review*, v24 n1 p27-58
- Barbazette, J. (2006). *Training Needs Assessment: Methods, Tools, and Techniques*. California: Pfeiffer.
- Bishop, L.J. (2012). *Staff Development and Instructional Improvement: Plans and Procedures*. Boston: Allyn and Bacon; Inc
- California Emerging Technology Fund. (2008). *California ICT Digital Literacy Assessments and Curriculum Framework*. Retrieved from <http://www.ictliteracy.info/rtf/pdf/California%20ICT%20Assessments%20and%20Curriculum%20Framework.pdf>
- Collins, J. W. and O'Brien, N. P. (Ed). (2012). *The Greenwood Dictionary of Education (2nd edition)*. California: Greenwood.
- Diana H. Gruman & Lucy L. Purgason. (2019). A brief experiential school counseling site supervisor training approach, *The Clinical Supervisor*, 38:2, 243-261, DOI: 10.1080/07325223.2019.1635061
- He, J. (2020). Research and Practice of Flipped Classroom Teaching Mode Based on Guidance Case. *Education and Information Technology*. <https://doi.org/10.1007/s10639-020-10137-z>
- Kaplan, Robert S., and Nolan, Richard L., and Norton, David, The Creative Consulting Company (2018). *Harvard Business School Accounting & Management Unit Working Paper No. 19-001*. Available at SSRN: <https://ssrn.com/abstract=3206642> or <http://dx.doi.org/10.2139/ssrn.3206642>
- Kitti-ratchadanon, S. (2007). *The Development of The Instructional Supervision Model in Basic Education Institution*. <http://dric.nrct.go.th/Search/SearchDetail/198709>



- Kitti-ratchadanon, S.; Chanbanjong, Ch.; Meejaeng, S.; & Chansila, W. (2009). The Development of the Instructional Supervision Model of Teachers in Basic Education Institutes. *Journal of Education Naresuan University* special edition 2009. Retrieved from <http://www.edu.nu.ac.th/research/doc/14%CA%D8%C0%D2%C0%C3%B3%EC%20%A1%D4%B5%B5%D4%C3%D1%AA%B4%D2%B9%B9%B7%EC.pdf?fclid=IwAR3XH5EKQciA63Pjh-72ytAXwPd53cURUsdytDysQN4gaJq811hZpHa7o>
- Kotter, John P. (2017). *The Heart of change*. New York: Harvard Business School Publishing.
- Lynch, David. (2012). *Preparing Teachers in Times of Change: teaching schools, new content and evidence*. Tarragindi: Primrose Hall Publishing Group.
- Office of Nation Education Standards and Quality Assessment: ONESQA. (2018). *Information System for External Quality Assurance*. Retrieved February 20th, 2020 from <http://203.144.163.91/onesqa/th/home/index.php>
- Oliva. (2005). *Developing the Curriculum*. New York: Harper Collins Publishers.
- O'Reilly, E.N. (2016). Developing Technology Needs Assessments for Educational Programs: An Analysis of Eight Key Indicators. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 2016, Vol. 12, Issue 1, pp. 129-143
- Partridge, L. (2007). *Managing Change*. Oxford: Elsevier.
- Richard, J. C. and Schmidt, R. (Ed.) (2010). *Longman Dictionary of Language Teaching and Applied Linguistics* (4th edition). Malaysia: Longman.
- Royse, D.; Station-Tindall, M.; Badger, K.; & Webster, J.M. (2009). *Needs Assessment: Pocket Guides to Social Work Research Methods*. Oxford University Press.
- Rouse, M. (2019). *Web application (Web app)*. Retrieved March 2nd, 2020 from <https://searchsoftwarequality.techtarget.com/definition/Web-application-Web-app>
- Sharkey, J.D., Hunnicutt, K.L., Mayworm, A.M., Schiedel, K.C. & Calcagnotto, L. (2014). Effective Yard Supervision: from Needs Assessment to Customized Training. *Contemporary School Psychology* 18, 103–116. <https://doi.org/10.1007/s40688-014-0011-0>
- Smith and Lynch. (2010). *Rethinking Teacher Education: Teacher education in the knowledge age*. Sydney: AACLM Press.



Southwest Comprehensive Center. (2008). *A guide for comprehensive needs assessment*. Retrieved February 28th, 2020 from https://www.cde.state.co.us/sites/default/files/documents/fedprograms/dl/consapp_na_guide.pdf

Thammasaeng, P.; Pupat, P.; and Petchaboon, S. (2016). Needs Assessment of Information and Communication Technology Literacy (ICT Literacy) of Students in Secondary Educational Service Area. *International Journal of Emerging Technologies in Learning: iJET* – Volume 11, Issue 12, 2016
<https://doi.org/10.3991/ijet.v11i12.5798>

Wongwanit, Suwimon. (2015). *Needs Assessment Research 3rd Edition*. Bangkok: Chulalongkorn University Press.