ISSN 2730-2601 RICE Journal of Creative Entrepreneurship and Management, Vol. 2, No. 2, pp. 38-55, May-August 2021 © 2021 Rajamangala University of Technology Rattanakosin, Thailand doi: 10.14456/rjcm.2021.26 Received 15.07.21/ Revised 24.07.21/ Accepted 31.07.21

#### Learning Administration Model of Thai Higher Education in the Digital Age

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#### Abstract

The objectives of this research were (1) to compare the opinions of faculty members toward learning administration in higher education in the digital age, and (2) to propose the model of learning administration in higher education in the digital age in Thailand. The questionnaire was used to collect data from 400 faculty members from public and private universities on a voluntary basis. The statistics used to analyze the data were descriptive statistics for percentages, means, and standard deviation, and inferential statistics for t-test, One-way ANOVA and LSD, followed by exploratory factor analysis. The results showed General management with the highest mean ranking for learning administration in higher education in the digital age, followed by Curriculum and instructional management, Educational evaluation, and Research. First, the aspects of General *management* included the collaboration among university members, policy planning and making, appropriate and selections of technological devices for learning in the digital age. Second, the aspects of *Curriculum and instructional management* focused on learning activities, online learning using different teaching software, learning outcomes emphasizing on ethical and moral development, instructional media development, new knowledge construction, and online learning preparation for both faculty and students. Third, the aspects of Educational evaluation emphasized formative evaluation, problem solving skills, innovation, and creativity. And fourth, the aspects of Research focused on collaborative research projects between institutions, collaborative research projects across different departments in the same institution to examine the impacts of learning and teaching in the digital age in Thailand. The researcher found differences of faculty members at the statistically significant level .05, by age, education level, position, university type and experience. Based on gender, males and females differed in all aspects except in General management. The participants with a Ph.D. and M.A. in public and private universities had different opinions in the aspects of Curriculum and instructional management. Those in administrative positions and nonadministrator positions differed in the aspects of General management and Educational evaluation. Since the highest mean ranking for the learning administration in higher education in the digital age was General management followed by Curriculum and instructional management, Educational evaluation, and Research, the proposed model was GCER.

Keywords: Model, learning administration, Thai higher education, digital age

#### **1. Introduction**

The university is an institution for higher education that offers undergraduate and graduate degrees. Universities offer graduate programs leading to a master's degree and Ph. D. The role of universities as repositories and generators of knowledge with the obligation to help graduates to obtain employment, while providing timely criticism in areas of public policy and social and economic life as influential bodies in civil society for

cohesive and tolerant communities (Ministry of Education, 2014). In Thailand, the traditional missions and functions of higher education institutions are teaching, researching, provisioning of academic services to society, and promoting arts and cultures. Higher education institutions are to play roles as watchdogs, social beacons and society conscience builders in the rapid socio-economic transformation of Thailand in the last two decades (Kirtikara, 2001). Meanwhile Phosa (2016) said that such roles require good management and improvements in the efficient use of manpower, all which will build up higher capacity for good higher education institutions. Likewise, a coherent government policy with clear continuity must be seriously implemented for success of the education reform sufficiently supported by relevant morale and physical/ digital infrastructure development.

The 21st Century is the digital age that uses Internet technology in storing, linking, sharing and disseminating information via electronic media across universities. Therefore, universities need to provide education using digital media and technology skills. The main media and auxiliary media are used to facilitate e-learning in addition to face-to-face teaching and learning management system. Learning through electronic media can be organized in many forms, such as online, website, m-learning, multimedia, multiapplication programs and platforms for real time meeting or non-real time in combination. Rennie and Morrison (2013) said that students must learn and adapt to keep up with change, develop information skills by searching through the web, creating a webpage and understanding assessments through online quizzes after practicing through e-book, groups blog, Pod cast, Webcasts, YouTube, Wikis, Skype and Line. Learners are expected to possess fluency in (1) technical skills in the use of use computers and the Internet skills including word processor, web browser, email, communication tools to access knowledge and online database via search engine and cloud computing. (2) Understanding context and evaluating digital media to be able to make decisions about the nature of work and the effects of network technology realizations on behaviors, perspectives, beliefs and feelings toward the outside world for effective communication and coordination at work. (3) Creating contents and communicating them through a variety of digital media tools. Creating with digital media is more than just knowing how to use word processing programs or writing emails, but it means that media users are able to create, modify and share contents in specific contexts via blogs, images, videos, social media and other forefront platforms (Media Smarts, 2015).

Educators need to assess learners' achievement in terms of gained knowledge and abilities in various learning activities based on blogging or peer assessment. After the course of study, students can be tested by electronic measuring instruments both in the classroom and afterward. The researchers noted the role of technologies in changing assessment to be smarter, faster, fairer and more effective. Assessment is a broad term and takes a broad approach to formative, summative and other types of assessment, such as eassessment and e-portfolio. However, an argument here is that through the social affordances of digital technologies, such as social media, blogs, wikis, e-portfolios and electronic voting for assessment, there should be opportunities to extend assessment challenges to aggregated, collective, crowd-sourced grading for learners to decide on artifacts to be used in assessment by particular assessors or evaluators. Such new assessment opportunities can empower learners' decision- making skills, which are important in preparing young people to participate effectively in a democratic society (Schwartz & Arena, 2009).

Considering changing technology and individual learning styles in the digital age and beyond in higher education as affecting the quality of education administration, the researcher would like to find out a model in learning administration in Thai higher education in the digital age, as perceived by educators concerned. It was expected that the obtained findings could benefit of short- and long- term planning for faculty members and students in higher education institutions in line with the current and upcoming changes in the near future.

# 2. Research Objectives

The objectives of this research were (1) to compare the opinions of faculty members toward *learning administration* in higher education in the digital age, and (2) to propose the *model of learning administration* in higher education in the digital age in Thailand.

# 3. Hypothesis

The faculty members, classified by (1) gender, (2) education level, (3) position, (4) university type and (5) experience have different opinions on learning administration in higher education in the digital age.

# 4. Conceptual Framework of Learning Management Model in Higher Education in the Digital Age

# 4.1 Roles of Higher Education

- (1) development of human resources and social development,
- (2) creation and diffusion of knowledge in the creation and transmission of knowledge in a knowledge society,
- (3) reforming the social system and cultivating social cohesion, and
- (4) mean of self-realization people can improve their income and quality of life through increasing knowledge or skills and then expand on their own choices available in life, including those related to work life.

The traditional missions and functions of higher education are teaching, researching, providing academic services to society, and promoting arts and cultures (Ministry of Education, 2014).

# 4.2 Digital Technologies, Technology Enhanced Assessment

Technologies can support or spur educational changes, particularly assessment as a vital part in the learning process, as it provides observable evidence of learning, determines student progress and demonstrates understanding of the curriculum. More broadly, it could be said that an institution, culture, or society depicts its conceptualization of learning and ideal future citizens by how assessment is created and used (Bates, 2016). As known, Information Communication Technology (ICT) has now accounted for success in curriculum and teaching (Petchroj, 2021).

## 5. Research Methodology

The participants in the study were 400 faculty members in public and private universities in Thailand, 200 for each type on a voluntary basis. The research instrument for collecting data was a questionnaire which was checked by three experts for IOC value calculation at 0.87 and its reliability was at 0.97.

As for data analysis, the researcher used descriptive statistics to find percentages, means, and standard deviation, and inferential statistics: t-test, One-way ANOVA, LSD, and exploratory factor analysis by using the principal axis method and varimax rotation technique.

# 6. Data Analysis

## 6.1 Results on Learning Administration in Higher Education in the Digital Age

Table 1 shows the faculty member's opinions toward learning administration in higher education at a high level. The highest aspect was general management, followed by curriculum and instructional management, educational evaluation and research. The details of each aspect are presented in Tables 2-5.

Table 1: Mean and Standard Deviation of Faculty Members' Opinions toward Learning
Administration in Higher Education in the Digital Age

Aspect	Description	x	SD	Meaning	Series no.
1	General Management	4.39	.59	high	1
2	Curriculum and Instructional Management	4.26	.56	high	2
3	Educational Evaluation	4.16	.49	high	3
4	Research	3.97	.57	high	4
	Total	4.20	.47	high	

Table 2 reports faculty members' opinions toward learning administration in higher education in a digital age with the total at a high level and 6 items at the highest level. The highest number was promoting the participation of all sectors of the university in implementing strategies in the digital age. The lower numbers were determining the direction, goals, and management plans to be consistent with higher education, setting digital matters as part of the policy and action plan of the university, making university development plan for both short term and long term to support the digital age, setting criteria to monitor the management of university, and providing appropriate equipment to support learning activities

Table 2: Mean and Standard Deviation of Faculty Members'	Opinions toward Learning
Administration by General Management	

	Description	x	SD	Meaning	Series no.
1	Setting digital matters as part of the policy and action plan of the university	4.63	.58	highest	3
2	Making university development plan for both short term and long term to support the digital age	4.58	.59	highest	4
3	Determining the direction, goals, and management plans to be consistent with higher education in the digital age	4.68	.57	highest	2
4	Setting criteria to monitor the management of university in the digital age	4.57	.75	highest	5
5	Promoting the participation of all sectors of the university in implementing strategies in the digital age		.44	highest	1
6	Providing appropriate equipment to support learning activities in the digital age	4.53	.68	highest	6
7	Fostering an atmosphere conducive to learning in the digital age	4.21	.85	high	11
8	Supporting sufficient budget for activities	4.21	.77	high	10
9	Organizing digital media in education in a concrete way	4.21	.59	high	9
10	Developing and improving the environment to be a modern learning center	4.11	.85	high	13
11	Developing the university's infrastructure to have international quality	4.21	1.00	high	12
12	Providing personnel suitable for preparing university for the digital age	4.26	.84	high	8
13	Providing training for personnel to have good language skills for communication	4.10	1.02	high	14
14	Developing information, communication technology systems and increasing facilities in various fields	4.47	.68	high	7
	Total	4.39	.59	high	

Table 3 shows all items at a high level; the highest number was promoting teaching and learning activities through various applications, such as Google Classroom, Class Start, Zoom meeting, and the like. The lower numbers were inserting content in teaching and learning that emphasizes students' awareness of morality, organizing teaching and learning activities to enhance learning experience through ICT, encouraging teachers to create knowledge innovation about learning online, teaching through electronic media, developing modern teaching materials and increasing more online courses.

Table 3: Mean and Standard Deviation of Faculty Members' Opinions toward L	earning
Administration by Curriculum and Instructional Management	

	Description	x	SD	Meaning	Series no.
1	Increasing more online courses	4.36	.67	high	6
2	Curriculum focus on teaching and learning comparable to international standards	4.21	.77	high	12
3	Developing teachers to have technological competencies	4.21	.79	high	9
4	Making an agreement with Cyber University to develop students' potential together	3.79	1.06	high	15
5	Inserting content in teaching and learning that emphasizes students' awareness of morality		.60	high	2
6	Preparing the language for students to communicate better		.70	high	11
7	Preparing innovation technology for students to be able to use them fluently		.74	high	8
8	Using textbooks, electronic media to enhance learning management		.76	high	13
9	Teaching through electronic media	4.36	.59	high	5
10	Using more modern electronic media (ICT)	4.21	.62	high	10
11	Promoting teaching and learning activities through various applications, such as Google Classroom, Class Start, Zoom meeting, and the like		.68	highest	1
12	Developing modern teaching materials	4.36	.67	high	6
13	Organizing teaching and learning activities to enhance learning experience through ICT		.59	high	3
14	Supporting credit transfers between Thai higher education universities		.72	high	14
15	Encouraging teachers to create knowledge innovation about learning online	4.42	.73	high	4
	Total	4.26	.46	high	

Table 4 shows all items at a high level; the highest number was evaluating of 3phase activities: before, during, and the end of study. The lower numbers were: evaluating of students' problem-solving ability, providing necessary basic assessment skills to the faculty members concerned, organizing activities to measure learning results in various forms instead of the final exam, and providing opportunities to evaluate and assess knowledge in each unit of study.

Table 4: Mean and Standard Deviation of Faculty Members'	Opinions toward Learning
Administration by Educational Evaluation	

	Description	X	SD	Meaning	Series no.
1	Having training, meetings, seminars, exchange of knowledge and experience in measuring and evaluating online	4.05	.83	high	11
2	Providing necessary basic assessment skills to the faculty members concerned	4.42	.59	high	3
3	Providing opportunities to evaluate and assess knowledge in each unit of study	4.37	.67	high	5
4	Organizing activities to measure learning results in various forms instead of the final exam	4.42	.59	high	3
5	Continuing to publicize the measurement data through various media channels		.69	high	9
6	Having various types of examination of knowledge		.75	high	13
7	Providing instruction manuals for learning instruction and evaluation	3.95	.94	high	12
8	Organizing knowledge exams between university and related institutions	3.58	.82	high	15
9	Encouraging faculty members to prepare a library for online learning exams	3.84	.99	high	14
10	Promoting learning assessment based on learning development criteria	4.16	.81	high	10
11	Evaluating by online exam (quiz online) before and after class	4.26	.71	high	8
12	Evaluating of 3-phase activities: before, during, and the end of study	4.42	.49	high	1
13	Evaluating student creativity	4.26	.64	high	7
14	Evaluating students' problem-solving ability	4.42	.54	high	2
15	Assessing students' self-study report	4.26	.63	high	6
	Total	4.16	.50	high	

Table 5 reports all items at a high level; the highest number was promoting the dissemination of research for digital transformation of Thailand. The lower numbers were: promoting joint research cooperation activities between institutions, doing network of coresearch between private and public institutions, focusing more on research in education in

the digital age, and promoting education as impact on digital age teaching and learning in Thai society in the future.

	Description	x	SD	Meaning	Series no.
1	Focusing more on research in education in the digital age	4.00	.72	high	4
2	Doing network of co-research between private and public institutions	4.05	.76	high	3
3	Doing network of co-research between universities in Thailand and institutions abroad	3.95	.89	high	7
4	Promoting cooperation for a research center in the university	3.89	.85	high	10
5	Supporting and promoting the preparation of information to support research	3.95	1.07	high	6
6	Promoting the dissemination of research for digital transformation of Thailand	4.21	.69	high	1
7	Promoting / supporting / allocating budget for foreign professors with good knowledge, abilities and expertise. Doing research in the institute to raise the quality of the standard		.66	high	11
8	Promoting joint research cooperation activities between institutions	4.10	.64	high	2
9	Promoting research cooperation activities to make Thailand a research center for digital learning	3.90	.91	high	9
10	Developing information centers for research in higher education institutions		.94	high	8
11	Promoting education with impact on digital age teaching and learning in Thai society in the future	4.00	.92	high	5
	Total	3.97	.50	high	

Table 5: Mean and Standard Deviation	of Faculty Members'	Opinions toward	Learning
Administration by Research		_	_

#### 6.2 Results of Comparison of Faculty Members' Opinions toward Learning Administration in Higher Education

The results of comparison of faculty members' opinions toward learning administration in higher education in the digital age are shown in Tables 6-7.

Table 6 reveals that the total aspect of learning administration classified by gender and university type was statistically significant at the .05 level. The aspect of general management was different when classified by position. Differences were found in (1) the aspect of Curriculum and Instructional Management classified by gender, education and university type, (2) the aspect of Educational Evaluation classified by gender and university type, followed by (3) the aspect of Research classified by gender, position and university type.

Aspect	Learning Administration	Gender (Male/female)		Education (MA/PhD)		Education (MA/PhD) (Administrator /non- administrator)		Univers (Public U U	ity Type . /Private .)
		t	sig	t	sig	t	sig	t	sig
1	General Management	.83	.41	66	.51	7.44*	.00	-1.31	.19
2	Curriculum and Instructional Management	-4.32*	.00	3.03*	.00	-1.18	.24	-6.30*	.00
3	Educational Evaluation	-3.68*	.00	16	.88	-2.13*	.03	-2.32*	.01
4	Research	-3.28*	.00	.28	.77	1.41	.16	51	.61
	Total	-3.16*	.00	87	.38	1.81	.07	-2.62*	.00

**Table 6:** Comparison of Faculty Members' Opinions toward Learning Administration Classified by Gender, Education, Position and University Type

\*Statistical significance at level .05

Table 7 shows the results of the analysis of variance of total and individual aspects classified by experience were statistically significant at the .01 level.

**Table 7:** Analysis of Variance of Faculty Members' Opinions toward Learning Administration

 Classified by Experience

Aspect	Strategies	Sources of Variance	SS	df	MS	F	Sig
1	General Management	between group	27.951	3	9.317	33.177**	.000
		within group	111.21	396	.281		
		total	03.741	399			
2	Curriculum and Instructional Management	between group	9.027	3	3.009	16.115**	.000
		within group	73.938	396	.187		
		total	82.965	399			
3	Educational Evaluation	between group	2.826	3	.942	3.896**	.009

Aspect	Strategies	Sources of Variance	SS	df	MS	F	Sig
		within group	95.748	396	.242		
		total	98.574	399			
4	Research	between group	11.162	3	3.721	9.013**	.000
		within group	163.475	396	.413		
		total	200.676	399			
	Total	between group	7.597	3	2.532	12.364**	.000
		within group	81.102	396	.205		
		Total	88.699	399			

\*\*Statistical significance at level .01

Table 8 reports the results on pair comparison classified by experience of faculty members  $\geq$ 31 years had a higher mean than those with 6-15 years in total and individual aspects, those with  $\leq$ 5 years in total and individual aspects of general management and educational evaluation, those with 16-30 years in educational evaluation and research.

**Table 8:** Pair Comparison of Faculty Members' Opinions toward Learning Administration

 Classified by Experience

Aspect		≤5 years	6-15 years	16-30 years	≥31 years
1. General Management	X	4.20	4.04	4.52	4.70
$\leq$ 5 years	4.20	-	.16	32*	50*
6-15 years	4.04		-	48*	66*
16-30 years	4.52			-	18
$\geq$ 31 years	4.70				-
2.Curriculum and Instructional Management	$\overline{\mathbf{X}}$	4.25	3.99	4.42	4.34
$\leq$ 5 years	4.25	-	.26*	17	09
6-15 years	3.99		-	43*	35*
16-30 years	4.42			-	.08
$\geq 31$ years	4.34				-
3. Educational Evaluation	$\overline{\mathbf{X}}$	4.23	4.01	4.15	4.22
$\leq$ 5 years	4.23	-	.22*	.08	.01
6-15 years	4.01		-	14	21*
16-30 years	4.15			-	07
≥31 years	4.22				-
4.Research	$\overline{\mathbf{X}}$	3.78	3.98	3.86	4.20
$\leq$ 5 years	3.78	-	20*	08	42*

Aspect		≤5 years 6-15 years		16-30 years	≥31 years
6-15 years	3.98		-	.12	22*
16-30 years	3.86			-	34*
≥31 years	4.20				-
Total	$\overline{\mathbf{X}}$	4.12	4.00	4.24	4.37
$\leq$ 5 years	4.12	-	.12	12	25*
6-15 years	4.00		-	24*	37*
16-30 years	4.24			-	13
$\geq$ 31 years	4.37				-

\*Statistical significance at level .05

# 6.3 Results of Factor Analysis of Faculty Members' Opinions toward Learning Administration in Higher Education

Table 9 shows eight factors. The important criteria for factors were (1) the Eigen value more than 1.00, (2) factor loading of the variables equal .30 or above, and (3) not less than 3 meaningful variables. Testing of KMO and Bartlett's Test with KMO=.809 nearly 1.00 showed that the data were suitable for factor analysis, for the total co-variance of sample was 87.009 % explaining factors, carrying Eigen value between 1.178-16.806.

Of eight factors on learning administration in higher education in the digital age, the first important factor was (1) General Management, followed by the other factors: (2) Curriculum and Instructional Management, (3) Educational Evaluation, (4) Research, (5) University Technology Planning, (6) and Improving Student Abilities, (7) Enhance the Experiences through ICT, and (8) Student Activities and Morality. Thus, the learning administration model should start from general management, curriculum and instructional management, education evaluation, research, university planning, and improving student abilities.

Items	Factor Loading							
	1	2	3	4	5	6	7	8
a7) Fostering an atmosphere conducive to learning in the digital age	.858							
a10) Developing and improving the environment to be a modern learning center	.848							
a12) Providing personnel suitable for preparing university for the digital age	.828							
a9) Organize digital media in education in a concrete way	.819							
a11) Developing the university's infrastructure to have international quality	.784							
a14) Developing information, communication technology systems and increasing facilities in various fields	.767							

Table 9: Factor Loading of Factors of Learning Administration in Higher Education

Items	Factor Loading							
	1	2	3	4	5	6	7	8
<ul> <li>a6) Providing appropriate equipment to support learning activities in the digital age.</li> </ul>	.725							
Eigen Value Factor 1	16.806							
b11) Promoting teaching and learning activities through various applications, such as Google Classroom, Class Start, Zoom meeting, and the like		.876						
b9) Teaching through electronic media		.865						
b2) Curriculum focus on teaching and learning that is comparable to international standards		833						
b1) Increasing more online courses		.812						
b10) Using more modern electronic media (ICT)		.779						
b8) Using textbooks, electronic medias to enhance learning management		.754						
b12) Developing modern teaching materials		.669						
b3) Developing teachers to have technological competencies		.572						
b12) Encouraging teachers to create knowledge innovation about learning online		.458						
Eigen Value Factor 2		5.449						
d13) Evaluating student creativity			.840					
d11) Evaluating by online exam (quiz online) before and after class			.837					
d5) Continuing to publicize the measurement data through various media channels			.812					
d4) Organizing activities to measure learning results in various forms instead of the final exam			.657					
d12) Evaluating 3-phase activities:			(50)					
d2) Providing necessary basic			.030					
assessment skills for the faculty members concerned			.553					
d1) Having training, meeting, seminars, exchange of knowledge and experience in measuring and evaluating online			.358					
d10) Promoting learning assessment based			327					
Eigen Value Factor 3			4 167					
c2) Doing network of co-research			1.107	784				
<ul> <li>c8) Promoting joint research cooperation activities between institutions</li> </ul>				.777				
c6) Promoting dissemination of research for digital transformation of Thailand				.599				
c11) Promote education with impact of digital age on teaching and learning in Thai society in the future				.493				
c1)Focusing on more research in education in the digital age				.400				
Eigen Value Factor 4				2.598				
a3) Determining the direction, goals, and management plans to be consistent with higher education in the digital age					.907			

Items	Factor Loading							
	1	2	3	4	5	6	7	8
a2)Making university development plan for both short term and long term to support the digital age					.552			
a1) Setting digital matters part of the policy and action plan of the university					.469			
Eigen Value Factor 5					2.428			
d14)Evaluating students' problem solving ability						.904		
d15)Assessing from the students' self-study report						.603		
b1) Increasing more online courses						.337		
Eigen Value Factor 6						1.505		
<ul> <li>a4) Setting criteria to monitor the management of university in the digital age</li> </ul>							.420	
b6) Preparing students for better language communication							.369	
b13) Organizing teaching and learning activities to enhance the experience through ICT							.369	
Eigen Value Factor 7							1.283	
d3) Providing opportunities to evaluate and assess knowledge in each unit of study								.681
b5) Inserting content in teaching and learning that emphasizes students' awareness of morality								.511
d15) Assessing the students' self-study report								.376
Eigen Value Factor 8								1.178

# 7. The Learning Administration Model in Higher Education in the Digital Age

From the factor analysis results, the learning management model GCER consisted of 4 steps: (1) factors 1 and 5 for Step 1: General Management (**G**), (2) factors 2, 7 and 8 for Step 2: Curriculum and Instructional management (**C**), (3) factors 3 and 6 for Step 3: Educational Evaluation (**E**), and () Factor 4 for Step 4: Research (**R**).



### 8. Conclusion of Results

#### 8.1 Learning Administration

Learning administration in Thai higher education in the digital age contained total and individual aspects at a high level. The highest aspect was of general administration. The lower numbers were curriculum and instructional management, educational evaluation and research.

## 8.1.1 General Administration

General administration had six aspects at the highest level of which the highest mean was promoting the participation of all sectors of the university in implementing strategies in the digital age. The lower mean values were determining the direction, goals, and management plans consistent with higher education, setting digital matters part of the policy and action plan of the university, making university development plan for both short term and long term to support the digital age, setting criteria to monitor the management of university, and providing appropriate equipment in support of learning activities.

## 8.1.2 Curriculum and Instructional Management

Curriculum and instructional management had highest mean in promoting teaching and learning activities through various applications, such as Google Classroom, Class Start, Zoom meeting, and the like. The lower numbers were inserting content in teaching and learning that emphasizes students' awareness of morality, organizing teaching and learning activities to enhance the experience through ICT, encouraging teachers to create knowledge innovation about learning online, teaching through electronic media, developing modern teaching materials and increasing more online courses.

## 8.1.3 Educational Evaluation

Educational evaluation had the highest number in evaluating 3-phase activities: before, during, and the end of study. The lower numbers were: evaluating of students' problem-solving ability, providing necessary basic assessment skills to the faculty members concerned, organizing activities to measure learning results in various forms instead of the final exam and providing opportunities to evaluate and assess knowledge in each unit of study.

## 8.1.4 Research

Research had the highest mean in promoting the dissemination of research for digital transformation of Thailand. The lower numbers were: promoting joint research cooperation activities between institutions, doing network of co-research between private and public institutions, focusing more on research in education in the digital age and promoting education as impact of digital age on teaching and learning in Thai society in the future.

## 8.2 The Comparison of Various Aspects

The comparison of various aspects shows statistical significance at level .05 in total when classified by gender and university type. Meanwhile, individual aspects were found significantly different under general management when classified by position, under Curriculum and Instructional Management when classified by gender, education and university type, under Educational Evaluation when classified by gender and university type. When classified by experience, faculty members with  $\geq$ 31 years had higher mean than those with

6-15 years in total and all aspects, those with  $\leq$ 5 years in total and aspects of General Management and Educational Evaluation, and those with 16-30 years in Educational Evaluation and Research. Meanwhile those with  $\leq$ 5 years were higher than those with 6-15 years in Curriculum and Instructional Management and in Educational Evaluation.

#### **8.3 Factor Analysis Results**

From the factor analysis results the researcher concluded the learning administration model as GCER in higher education in the digital age, derived from 4 steps: factors 1 and 5 for Step 1: General Management (G), factors 2, 7 and 8 for Step 2: Curriculum and instructional management(C), factors 3 and 6 for Step 3: Educational Evaluation (E), and factor 4 for Step 4: Research (R).

#### 9. Discussion of Results

The researcher discussed the obtained results in three major points:

#### 9.1 Learning Administration

Learning administration in higher education in the digital age had total and individual aspects at a high level. The highest aspect was General Management in promoting the participation of all sectors of the university in implementing strategies in the digital age. It is possible that a university must change its policy and action plan to develop infrastructure in support of ICT, modern media, wireless, computer, network, teaching learning tools and facilities (Ghavifekr et al., 2015). In Thailand, ICT is considered one of the main elements in digitally transforming the country's education and economy for a better future as emphasized by Suchato (2017) in integrating information systems for modern education via networking and online courses. Faculty members need to use web/elearning tools, electronically organize materials, assessments and rosters in coping with delivery of actively blended learning and flipped classroom. As for students, they certainly need digital literacy to access class via their mobile device, update forefront information for personal learning and class activities, with aspiration for life-long learning by online courses.

## 9.2 Results on the Compared Aspects

The results on the compared aspects were significantly different at the .05 level in total when classified by gender and university type, particularly General Management when classified by position, Curriculum and Instructional Management classified by gender, education level and university type, Educational Evaluation classified by gender and university type, and Research classified by gender, position and university type. When classify by experience, faculty member with  $\geq$ 31 years had higher mean than those with 6-15 years in total and all aspects, those with  $\leq$ 5 years in total and aspects of general management and educational evaluation, and those with 16-30 years in educational evaluation and research. The researcher noted that both female and male faculty members focus on academic and service. However, those male counterparts tend to show preference for technical matters like machines, mechanics and information technology (IT). This point was earlier reported and discussed by Athanasou (2009), in the development of a career by gender. Holland's Theory also says that males like mechanical careers while females like to contact and chat with people, like to give knowledge, teach others, and have language skills. In the aspects of Education Evaluation and Research, it was founded that faculty

members $\geq$ 31 years had higher mean than those with 6-15 years, because they started their teaching career earlier, accumulated their research skills and obtained academic ranks. It is rather typical in an academic career, as pointed out by Banoobhai (2017) who conducted research into the impact of teaching and learning experience on academic achievements. In addition, Jindanuruk (2016) and Pineida (2011) emphasized the vital role of digital literacy and competency in delivering good quality teaching to facilitate students' learning process and desirable outcomes, followed by encouraging students to develop their learning autonomy to become lifelong learners as an ultimate goal in higher education.

## 9.3 The Learning Administration Model GCER

The learning administration model GCER comprises General Management (G), Curriculum and instructional management(C), Educational Evaluation (E), and Research (**R**). (GCER model). We can see that the participating faculty members in the study were in favor of teaching and research. Certainly, they valued Internet technology, use of information via electronic media not only for their academic work, but also benefits for their students. This mutual benefits were studied by Odora & Matoti (2015) in that lecturers perceive their new roles in the digital age by using computer-based technology and other digital technologies for their work both in and out of the classroom. Rennie & Morrison (2013) asserted that it was important to improve students' digital literacy and skills to enable them to search through the Web, create a Webpage, and handle online assessment and quizzes. The use of Blog, Podcast, Webcast, Wiki, YouTube, Skype, and LINE groups, and other relevant applications. In this regard, one major government university in Thailand conducted research into digital literacy and skills and concluded that graduate students require digital skills for the knowledge-based economy and deep knowledge learning (Ministry of Education, 2014). This concluded point was agreed by Kiss (2017) who said that digital skills are required of modern learners to search, collect, process, and use information systematically, to be able to assess the connection and distinguish reality from the virtual world. And certainly, the aspect of Research cannot do without digital literacy and skills for a researcher to complete systematic inquiry on the basis of obtained information and needed data effectively.

## **10. Suggestions**

Based on the major findings of the study, the researcher had two suggestions:

#### **10.1 Learning Administration**

Learning administration in Thai higher education in the digital age would require adjustments from time to time to catch up with changes in needs of new faculty members, students and stakeholders.

#### **10.2 University Administrators**

University administrators need to provide constant inhouse training programs for faculty members to fit well and move forward with confidence in the changing contexts of technologies and innovations in the country's higher education system.

### 11. The Author

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## 12. Acknowledgement

The researcher most sincerely thanks Rajapruk University for the research grant in support of the research project.

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